## modern machine shop

FEATURES IN BRIEF Soo Page 102 CHEMICAL

MILLING Soo Page 104

AUTOMATIC DRILL FEEDS Soo Page 122

SEPTEMBER

# The only Jig Borer with Automatic Positioning and Direct Dimension Measuring Write for Catalog JB-SC The FOSDICK Machine Tool Co. Cincinnati 23, Ohio



#### Where precision counts . . . count on Texaco

Typical machining operation at Cummins Engine Company, Columbus, Indiana. An emulsion of Texaco Soluble Oil CX is used here, and has proved highly satisfactory in assuring efficient, low-cost production.

In machining parts for the famous Cummins high speed, light weight diesel engines, tolerances are close, finish must be perfect, rust cannot be tolerated. So it is significant that Texaco supplies cutting fluids for this work. For example, where a soluble oil emulsion is needed, Cummins uses Texaco Soluble Oil CX and consistently enjoys these benefits:

More Stable Emulsions: Texaco Soluble Oil emulsions remain stable even under the most adverse conditions, assure highest cutting efficiency.

Rust-Free Finish: With a Texaco Soluble Oil emulsion, finish on machined parts is uniformly smooth and rust-free.

Longer Tool Life: Texaco Soluble Oil emulsions effectively reduce wear on tools, keep them sharp for extra-long periods between regrindings.

Operators everywhere get similar results when Texaco is on the job. There is a complete line of Texaco Cutting, Grinding and Soluble Oils to help you do all your machining better, faster and at lower cost. A Texaco Lubrication Engineer will be glad to help you select the proper ones for your operation.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO SOLUBLE AND HYDRAULIC O

CUTTING, GRINDING, HYDRAULIC OILS

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#### modern machine shop

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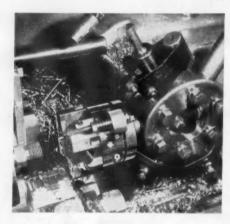
Accepted as controlled circulation publication at Cincinnati, Ohio.

(For more information on cover advertisements, use Reader Service Cards opposite pages 32 and 404.)

# LARGE

#### DIAMETER THREADING

on a Brown & Sharpe automatic



Pol nuts for gas cylinders, requiring both 11/8" and .880" diameter threads, are

threaded at the Fisher Governor Co. (Marshalltown, Iowa) on a No. 2 B & S Automatic using the 5 EXX LANDMATIC Head.

The EXX LANDMATIC is a compact stationary die head designed for threading operations on small screw machines. It uses tangential chasers and is built in two sizes-the 1/9" for No. 0 and No. 2 B & S machines with a range from #4 to 1/2"-and the 5/9" for No. 2 B & S machines with a standard range of #4 to 5/8". The 5/8" model can be equipped with oversize chaser holders, as shown here at Fisher Governor.

For detailed information and specifications on the EXX or other LANDIS Die Heads please ask for Bulletins F-80 and F-90.

460

LANDIS Machine COMPANY

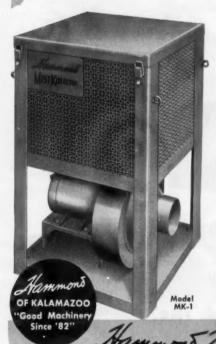
WAYNESBORO PENNSYLVANIA

For more data circle 201 on Reader Service Card

## CAPTURE

MIST-FOG-SMOG

#### with a Hammond MISTKOLECTOR



Mist, Fog and Smog from automatic screw machines, lathes, surface and cylindrical grinders, and other machine tools can now be captured with a Hammond MistKolector. Requires little floor space, or can be suspended from ceiling. Two models available.

Hammond MistKolectors soon pay for themselves as they:

- Collect fog, mist and smog
- Recover coolant for re-use
- Give operators cleaner air to breathe
- Keep plant cleaner and reduce maintenance costs
- Reduce fire hazards

Write

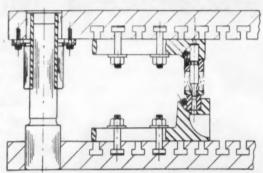
for Literature and Installation Photos

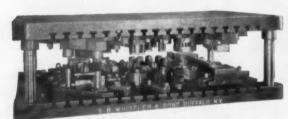
mmond Machinery Bue

See us at Booth No. 1250 Metal Show, Cleveland—October 8-12 For more data circle 202 on Reader Service Card

# ADJUSTABLE DIES by WHISTLER

• Operate like a single purpose die • Easy to set-up and make changes • Interchangeable and re-usable parts always ready for a new job • Reduce die costs to a new low • Pierce holes in any desired arrangement of shapes and sizes • Precision piercing of materials to 1/4" thick steel.





Above: Sectional drawing of a Whistler adjustable punch and die unit assembled in T-slot die set.

At the left: A completely assembled Whistler adjustable die ready for the press.

#### YOU NEED THIS CATALOG

to see for yourself in dollars and cents what this adjustable die making method can do for your plant. Send for it right now...without obligation.

#### S. B. WHISTLER & SONS, INC.

740 Military Road, Buffalo 23, N.Y.

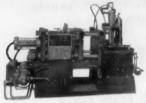
ADJUSTABLE, MAGNETIC and CUSTOM DIES FOR ALL INDUSTRY
Direct Factory Representatives Located in Principal Industrial Areas

Visit us at Booth 2014—National Metal Exposition, Cleveland—Oct. 8 to 12.

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#### your answer to Profitable die casting production



#### **CLEVELANDS**

Madel 50 Claveland 50-ten locking pressure Capacity: 2.6 lbs., aluminum 5.4 lbs., zinc



Model 200 Cleveland 200-ton locking pressure

Shown here are several models in the line of Cleveland Universal Hydraulic Die Casting Machines...each one a champion in its class! Whether the casting size is large or small, there's a Cleveland that will fit your production requirements exactly and give you castings of precision quality at a highly profitable rate.

The nation's leading die casters rely on Clevelands for dependable performance. Find out now how Clevelands can improve your die casting production with money saved. Call in a Cleveland sales engineer. For complete machine specifications, write for bulletins



Model 400N Claveland 400-ton locking pressure Capacity: 7.2 lbs., alum 14.5 lbs., zinc.

\*Locking pressure strain gage tested.



del 600 Cleveland 600-ton locking pressure" Capacity: 10 lbs., aluminum 25 lbs., zinc.

#### THE CLEVELAND AUTOMATIC MACHINE COMPANY

4940 Reech Street Cincinnati 12, Ohio SALES OFFICES: CHICAGO CLEVELAND . DETROIT HARTFORD . S. ORANGE

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines For more data circle 204 on Reader Service Card

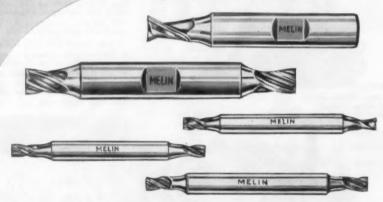


#### STUB LENGTH END MILLS

with flutes shorter than regular

Offer GREATER STRENGTH...

TWO, THREE AND FOUR FLUTE



Plus an Exclusive... In addition to manufacturing a complete line of End Mills, the Melin Tool Company makes several standard Stub Length Mills exclusive of other tool manufacturers.

The new Melin Tool Catalog No. 54-C lists the specifications on these all inclusive Stub Length Tools...and...they offer greater strength and less breakage. Write for your catalog...today.

Representatives in Principal Cities



MELIN TOOL COMPANY, INC.

3373 West 140th Street Cleveland 11, Ohio



For more data circle 205 on Reader Service Card













# NOW V-R TOOLHOLDERS Available to Handle 90% of all Machining

Negative and 6° Positive Rakes, Right and Left Hand Styles for All Standard Carbide Inserts

Carbide tooling costs can be cut 10% to 200% by replacing standard brazed tools with V-R toolholders and carbide inserts. Grinding costs are eliminated or reduced; carbide costs are reduced as is carbide inventory; tool changes are faster and there is less downtime. Get complete facts about the complete V-R toolholder line—.

#### ASK FOR NEW TOOLHOLDER CATALOG

Tells why a V-R toolholder is fastest, simplest-to-use. Gives complete data and prices for toolholders and inserts. Call your V-R Representative or Distributor, or write.



Manufacturers of cemented carbides and TANTUNG cast alloys



Vascoloy-Ramet Corporation

858 Market Street • Waukegan, III.

For more data circle 206 on Reader Service Card



CINCINNATI® FILMATIC 6"R x 18" Plain Hydraulic Grinding Machine equipped with Automatic Air-Electric Gage Sizing, with its exclusive Cycle Time Stabilizer. Complete information in two publications: G-660 and G-661. Write for your copies.

	Size	Between-Center Lengths	Catalog
	6"R) 10"L)	18" and 30"	G-660
5	10"R)	18", 36", 48" 72" and 96"	G-661



## CINCINNATI

CENTERTYPE GRINDING MACHINES . CENTERLESS GRINDING MACHINES

# You'll get precision to the "NIH" DEGREE

#### ... and consistently high production, too!

Speculation in precision and production has no place in today's metalworking shops. You can quickly end the guesswork where it hurts most . . . in your precision cylindrical work. Just install new CINCINNATI FILMATIC Plain Hydraulic Grinders in your shop and you'll have definite production that you can count on year after year, and within closer limits of accuracy than ever before. ¶Four

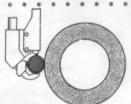
Cincinnati features that help you attain these highly desirable results are illustrated below. These and many other features, translated into benefits for your shop, are outlined in two attractive catalogs: G-660 for the 6"R and 10"L machines; G-661 for the 10"R and 14"L machines. Write for copies.

#### CINCINNATI GRINDERS INCORPORATED CINCINNATI 9, OHIO

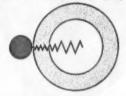




Grinding Wheel Balancing and FILMATIC Grinding Wheel Spindle Bearings are standard equipment, (FILMATIC principle illustrated at the left.) These two cost-reducing features alone are reason enough to choose Cincinnati,



Automatic air-electric gage sizing (extra) includes an exclusive Cincinnati advantage . . . cycle time stabilizer automatic compensation for wheel wear and truing.



Gap eliminator... greatly reduces time spent in "cutting air" during automatic infeed grinding operations, (extra)

#### CENTERLESS LAPPING MACHINES . MICRO-CENTRIC GRINDING MACHINES

For more data circle 208 on Reader Service Card



W. B. KNIGHT MACHINERY COMPANY
3922 West Pine Blvd.
St. Louis 8, Mo.

For more data circle 209 on Reader Service Card

#### NO OTHER DRILL IN ITS RANGE GIVES YOU SO MUCH FOR THE PRICE!

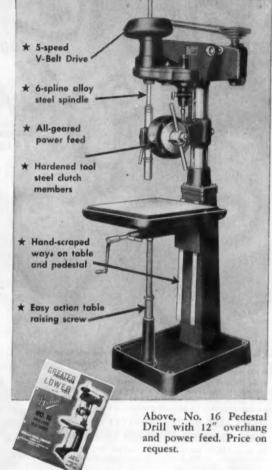


#### No. 16 DRILL

"Proven in Production"

Check price, design, and standard of construction - you'll find this 7/8" capacity drill a top value. No, you won't find fancy chrome trim or costhiking gadgets - but soundly engineered features like those shown here - features that make drilling easier, that promote accurate work and that add years to the drill's useful life. In short, features that cut your drilling costs.

Write today for details, including Bulletin 2730G, and see wby more and more users every day are calling the "Buffalo" No. 16 their best buy!





#### **BUFFALO FORGE COMPANY**

388 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. PUNCHING SHEARING

For more data circle 210 on Reader Service Card



THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING

Fond du Luc, Wisconsin

BORING TOOL DIVISION of Giddings & Lowis Machine Tool Company

WHEN SHARPENING DRILLS

## PRECISION

IS ALL-IMPORTANT

THE



DRILL POINTER

With the Oliver 510 Drill Pointer, all of the movements in sharpening a drill are automatic, and accomplished by fixed mechanisms to eliminate all chance of error. The Oliver 510 holds all drills from ¼" to 3" diameter and provides varying angles from 82 to 160 degrees. Available for either wet or dry grinding.

Oliver achieves the theoretically perfect point.





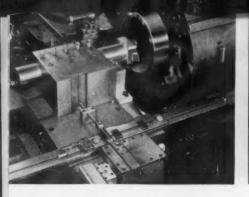
1430 EAST MAUMEE



ADRIAN, MICHIGAN

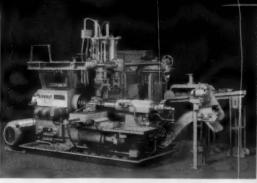
FACE MILL GRINDERS . AUTOMATIC DRILL GRINDERS . DIE MAKING MACHINES TOOL & CUTTER GRINDERS . DRILL POINT THINNERS . TEMPLATE TOOL GRINDERS

For more data circle 212 on Reader Service Card



NO. 24-WITH CHUCK

Ninety pounds of tough bearing steel are removed in two 8minute operations on this job. One No. 24 handles six types and 24 different sizes of inner and outer bearing races with ease and efficiency. A JETracer on the rear independent slide simplifies spherical, straight and taper boring operations—also improves accuracy and finish and lowers unit costs.



NO. 24-ON TAILSTOCK-SUPPORTED EXPANDING ARBOR

Automatic loading and unloading are part of the machining cycle on this setup. Utilizing overhead clamps and a traversing carriage arrangement, the No. 24 makes fast work of these tough steel tool joint forgings. The operator has separate pushbutton control over all machine and handling functions for faster, easier setups and change-overs.

#### YOU CAN REDUCE COSTS ON

#### **NEW GISHOLT MASTERLINE NO. 24**

WHETHER YOUR LARGE PART PRODUCTION INVOLVES long, steady runs or small repeat lots, you'll find definite ways to cut costs with this new Gisholt MASTERLINE No. 24 Automatic Production Lathe.

And you can realize these savings whether your work has to be held on an arbor, in a chuck or special fixture, or between-centers with work driver and tailstock—for the big No. 24 will handle parts all four ways.

Cost cutting with this extra powerful (up to 125 h.p.) single-spindle automatic is inherent within its standard automatic cycle. Hydraulic control of all carriage and auxiliary slide movements—plus automatic stopping and starting of the spindle—lets one operator handle two or more of these machines, or perform other jobs during machining time.

Still more savings are realized through faster, easier setup and shorter change-over periods. During setup, all hydraulic actuated movements may be manually controlled. Spindle speeds, feeds and stops are easily changed. This means you can produce a variety of large parts—or handle small repeats—without excessive down time between sizes or jobs.

Whatever type of large part you are producing now—or planning for the future—your Gisholt Representative can show you how and where the No. 24 will produce it for less cost. Call him today—or write Gisholt for complete information.



G SMACHINE COMPANY

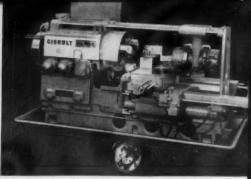
Madison 10, Wisconsin, U.S.A.





#### NO. 24-WITH CHUCK AND TAILSTOCK SUPPORT

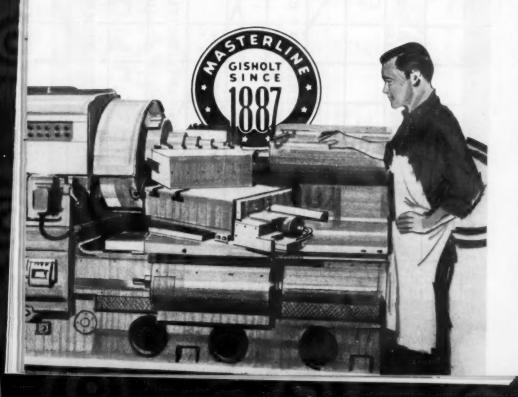
With this setup, husky airplane drive gear and propeller shafts are completed in two fast operations on two No. 24's. One man handles both machines. The first operation is shown. Five diameters are machined plus turning, facing and chamfering. The second operation, on the other end, is similar. Floor-togor time: 12 min. per operation with 75 lb. of metal removed.

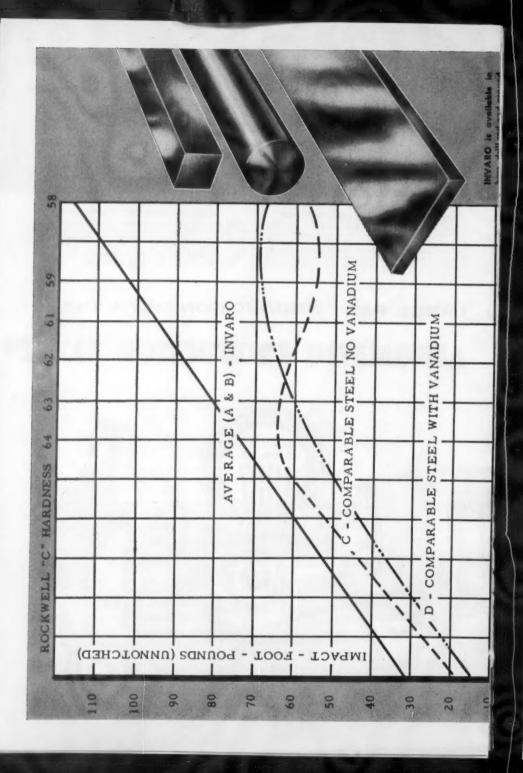


#### NO. 24-WITH CHUCK AND LOADING ARBOR

Here, standard tooling plus a unique, indexing-loading arbor arrangement on the No. 24 has cut costs and reduced effort in the machining of heavy cast iron diesel cylinder heads. Ploor-to-floor time is only 1.2 minutes. More time is spent making chips because most of the loading-unloading operation is performed while the tools are working on the next part.

# AUTOMATIC PRODUCTION WITH THE





TEMPERING TEMPERATURE IN DEGREES FAHRENHEIT

# of leading comparable oil-hardening tool and die steels INVARO ... IZOD-PROVED THE TOUGHEST

When the toughness of a tool and die steel is the critical factor of selection, Firth Sterling INVARO is the toughest of the tough! That's not just an opinion but a fact. Undeniable proof is established by the A.S.T.M. Izod Impact Test, results of which are graphically shown above, comparing steels both with and without vanadium.

INVARO shows a superior toughness in all ranges of temperature from a minimum advantage

of about 12% to as much as 100% greater! This marked superiority is the result of Firth Sterling's advanced metallurgical practices combined with 67 years of experience in the art of making specialty steels.

Yes, when you want toughness in your tools and dies, combined with uniformity, excellent hardening properties and safety in heat treating . . . specify INVARO.



	All test	samples were	machined from	rom half-inch	annealed bar	bar stock.		
Chemical Analysis	O	SS	Wn	S	4	*	^	Ö
Invaro A	88.	.34	1.22	010.	.020	67.	19	.50
Invaro B	.94	.25	1.20	.014	.013	.53	.22	49
Comp. C	06.	.33	1.24	110.	.025	.50	1	.55
Comp. D	.95	.34	1.27	010.	.020	.50	.21	.59

Firth Sterling

-INC-

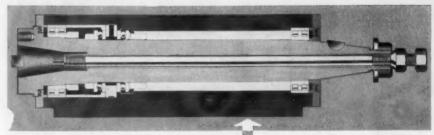
GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS: MCKEESPORT, TRAFFORD, DETROIT, HOUSTON
DFFICES AND WAREHOUSES»: BIRMINGHAM CHICAGO» CLEVELAND DAYTON DETROIT\* HARTFORD\*
HOUSTON LOS ANGELES\* NEW YORK PHILADELPHIA PITTSBURCH WASHINGTON WESTFIELD, N.J.,

PRODUCTS OF FIRTH STERLING METALLURGY
High Speed Steels
Tool & Die Steels
Stainless Specialties

High Temperature Alloys

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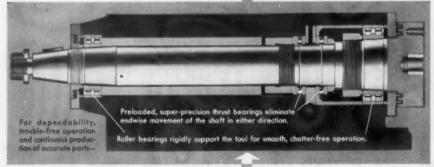
#### PRECISION MILLING

Heavy Duty

See for yourself! Here is one sturdy package with a massive shaft, and double row cylindrical roller bearings and ball thrust bearings that support your cutting tools rigidly to do their best work. POPE 9-12000 Series Belt Driven Pre-

POPE F-12000 Series Belt Driven Precision Milling Spindles are operable in any position. They come in sizes from I to 50 HP with standard milling machine tapers in the nose from #10 to #60. Bulletin S-8 gives complete dimensions. Let us mail you a copy.

POPE Heavy Duy Milling Spindles are also available in P-2500 Series, MOTORIZED, from 1 to 100 HP, totally enclosed, fan cooled; and in high cycle, water cooled units.



#### PRECISION BORING

Calls for this

POPE

Heavy Duty

BORING SPINDLE

Look it over! Here is a Boring Spindle capable of boring holes round within millionths of an inch. It produces fine surface finishes in the lower micro inch range.

POPE Super-Precision Heavy Duty Boring Spindles are available in both belt driven and motorized units to meet a wide range of speeds and horsepower. Send us your specifications for quotations.

> Pope designs, engineers and builds SPECIAL SPINDLES

No. 112

Specify

18

POPE

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET . HAVERHILL, MASSACHUSETTS

PRECISION SPINDLES

For more data circle 217 on Reader Service Card

# Production turning at 1/2 the cost!

FEATURE	Lodge & Shipley 10" HI-TURN	Lathe B	Lathe C
HEADSTOCK	/		
ull 5 horsepower	yes		
200 to 3000 r.p.m.	yes		
All spur gear drive	yes		
Swing over bed	131/4"		
Spindle speeds	9		
BED			
Width of bed	113/8"		
Depth of bed	115/16"		
Hardened, ground, replaceable bedways	yes		
QUICK CHANGE GEAR	вох		
Number of quick change	e feeds 9		
Range of Feeds, thous. p	er rev. 1.5	to 24	
CARRIAGE			
Carriage length	191/1	"	
Carriage bridge width	57/8"		
Cross slide travel	31/2"		
Hardened, ground, replaceable cross slide way	yes yes		
TAILSTOCK			
Tailstock spindle diameter	21/8"		
Tailstock spindle travel	41/2"		
MISCELLANEOUS			
ize of lathe tool	3/4" x 3/4"		
let weight, base machine	3400 lbs.		
mplate type length stops	yes		

Your Lodge-ical Choice for low-cost high-production

odge & Shipley

#### Lodge & Shipley 10" HI-TURN Production Lathe does job of really big lathe

. . . and completely outperforms any other 10" lathe!

BIG in power and production . . . BIG in speed, in rugged construction and accuracy, the Lodge & Shipley 10" HI-TURN Production Lathe costs only ½ the price of a good 13" lathe used for comparable work. Here are a few of the many features that put the 10" HI-TURN in the big lathe, big value class and

You make the comparison

put it 'way ahead of any 10" lathe:

with <u>any</u> 10" Lathe!



Compare the Lodge & Shipley 10" HI-TURN Production Lathe with any other 10" lathe . . . even with 13" lathes. If you don't need additional thread chasing facilities, it's the lathe for you!

Get complete details now. Write: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.



#### Change from milling to high-powered surface grinding saves 22¢ per piece!

Forged steel links were formerly milled, 100 pieces every three hours. Eighteen pieces were produced between sharpenings. At 35 minutes per sharpening, 3.2 hours of cutter maintenance were required for every three hours' production at a cost of \$16. This, plus machining cost of 15¢, gave a total cost of 31¢ each.

Today, links are machined, 30 pieces per load, 100 pieces per hour on the Mattison No. 24. Wheel cost per piece is 4¢, but maintenance is eliminated because wheel is self-dressing. With a labor and machine cost 5¢ per piece, total cost to grind is only 9¢—a saving of more than 22¢ per piece.

Mattison Machine Works, Rockford, Illinois, U.S.A.





PRECISION SURFACE GRINDERS



For more data circle 219 on Reader Service Card



#### "RACKING" FOR PERFECTION

Edlund Machinery Co. (Division of Precision Castings Co. Inc.) Cortland, N. Y., specializes in the manufacture of variable-speed drilling and tapping machines. The high-precision work performed by these machines demands that highest quality materials be used, that close tolerances be held and that long service life must be inherent in every working component of every machine.

To conform to these rigid requirements, Edlund makes use of characteristics found in B&W Mechanical Tubing. Purchased in multiple lengths, this tubing is used to make the spindle sleeves which control the up-and-down movement of drills and taps. Operations performed on the tubing include grinding, reaming, turning, tapping and threading. Following these steps, a flat is milled on the tube and a toothed rack is broached on this flat to engage a pinion.

The decision of Edlund to use B&W tubing was based on these findings, among others:

"Better machinability...cuts faster...finer finish ...teeth more durable...always uniform and straight

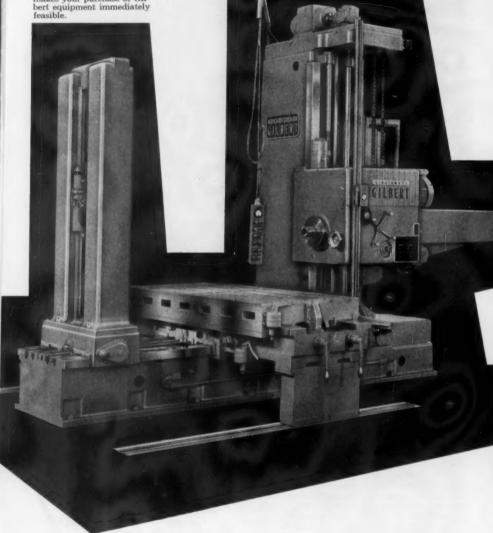
... superior to other tubing ... the end result is a better Edlund product."

At no premium cost, any user of mechanical tubing can have the premium qualities which are built into every foot of B&W tubing. Send for Mr. Tubes, your B&W representative who has all the facts you need. Or write for Bulletin 340. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels For more data circle 220 on Reader Service Card

Low-cost financing plan — 6% simple interest (3% add on), up to 5 years to pay—makes your purchase of Gilbert equipment immediately feasible.



### new 4" and 5"

Every modern feature that can reduce floor-to-floor time is built into these new Gilbert 4" and 5" boring mills.

For one example, your operator can preselect speeds and feeds, and power automatic shifting takes over from there. For another, the pushbutton station makes his job easier and reduces his machine-handling time. This controls start, stop, and reverse for spindle: spindle electric clutch and brake; reverse for all feeds; forward, reverse power rapid traverse; spindle and milling feeds and rapid traverse; back gear clutch on spindle sleeve; milling feeds to head, table, and saddle (table type), or head and column (floor type); spindle feed electric clutch; power clamp, head to column (table type) or to head and base-to-runway (floor type); and automatic positioning, if ordered.

The built-in reversible motor (up to 20 hp) on the head puts maximum power to the tool; there are no long drive shafts. Speeds up to 1.500 rpm are standard.

The Cincinnati Gilbert Machine Tool Co. 3366 Beekman Street, Cincinnati 23, Ohio

those who buy
GILBERT
buy Gilbert again

### boring mills

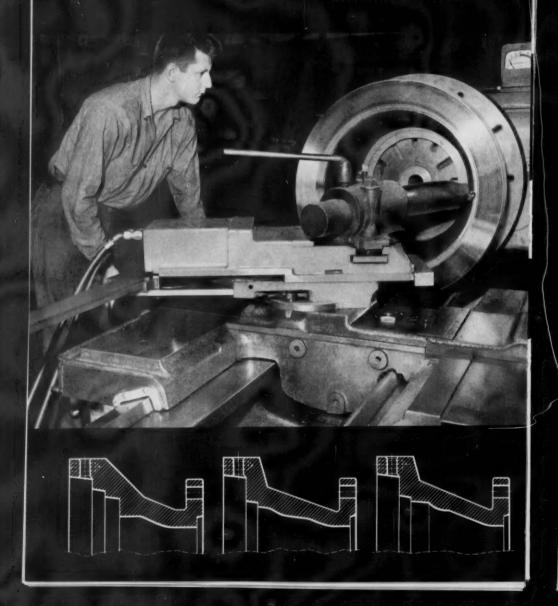
For more data circle 222 on Reader Service Card

September, 1956

modern maachine shop

23

before you buy a tracing lathe,
find out how economically



#### you can ...

#### add HYDRA-TRACE\* to your Present LeBlond

American Cost Iron Pipe Co. did! Now they have all the advantages of a "new" tracing lathe, at a fraction of new-lathe cost. Actually, Hydra-Trace Duplicating Attachment is quickly and easily installed on most any LeBlond Lathe built since 1935.

This tracing-boring job at American Cast Iron Pipe Co., Birmingham, Ala., is a good example of Hydra-Trace performance. Bells for centrifugal pipe molds are machined internally with Hydra-Trace feeding at 30° angle. The part is finished in one-third time required for hand-fed turning. Details of the machining operation were worked out by LeBlond engineers, who prepared prints and template pattern for American.

LeBlond offers a wide variety of useful turning attachments. Because of the inherent stamina of LeBlond machines, our customers often solve special turning problems by adding to their present machine—good for many more years of dependable service.

Perhaps you, as a LeBlond Lathe owner, have a tracing job made to order for Hydra-Trace. Our field engineers are always on call, ready to work with you in solving your specific turning problems. Write today and tell us your needs.

•Hydra-Trace (Trade Mark registered U.S. Pat. Off.) is LeBiond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

... cut with confidence



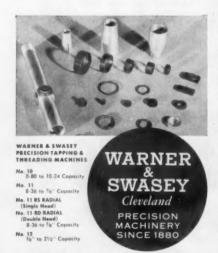
THE R. K. LEBLOND MACHINE TOOL COMPANY
CINCINNATI 8, OHIO

World's largest builder of a complete line of lathes for more than 69 years

Simply adding HYDRA-TRACE made a tracing lathe of this five-year-old 32" LeBlond Heavy Duty—at small cost. These parts call for tracing-boring operation. Material #1025 steel; spindle speed 35 rpm; feed .016; carbide tool: finish 60 micro-inches; tolerance ±.0025. Machining time 3 hours, one-third time required for hand-feet turning.



Warner & Swasey Precision Tapping Machine



"Texan" telescopic rifle sights made by Norman-Ford & Company, Tyler, Texas, require high precision machining throughout for accurate optical alignment. That's why 0-80 to 15%" threads in retaining rings, lens, cells, and windage and elevator adjusting screws are cut on their Warner & Swasey No. 11 Tapper.

This machine with its exclusive positive. leading-on principle—solenoid-actuated guide fingers operating on a hardened lead screw—assures precision tap lead, and eliminates shaving threads on the return stroke. This is important at Norman-Ford because of the fine pitches in relatively soft 24-ST aluminum alloy and mild steel parts.

If your work requires tapping Class 3 and 4 threads on a production basis, discuss with our Field Representative how a Warner & Swasey can speed work, cut scrap loss, and increase profits for you.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS ... WITH A WARNER & SWABEV
For more data circle 225 on Reader Service Card

for ...

General-Purpose Sawing

High Speed Accuracy, Economy



MARVEL No. 4B HIGH SPEED HACK SAW Exclusive features

Let us prove to you the many reasons why this MARVEL Hack Saw offers the cheapest, most accurate and fastest "cutoff" method available to you at a low initial cost.

Ask your dealer, or write us for Bulletin GP35 which fully describes and illustrates the many exclusive features which makes this Hack Saw Machine your "best buy".

- 1. Horizontal Ball Bearing Saw Frame.
- 2. Screw Feed-Automatic or Hand Driven.
- 3. Quick Return Stroke—allows greater number of strokes per minute.
- 4. Simple Positive Coolant System.
- 5. Adjustable Stroke—can be shortened for larger
- 6. Speed Range-available in 1, 2 or 4 speed models for wider range of work.



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Avenue • CHICAGO 39, ILL.

For more data circle 226 on Reader Service Card

September, 1956

modern machine shop 27

## NEED LOW-COST, PRODUCTION OF

Po	ort .	No. of Stations	Operations		Production	
	Cover Cylinder Frant	4	19 drilling 3 boring 6 chamfering 6 tapping 1 reaming	TOTAL 35	137 pco./hr.	
68	Carburetor Main Body	6	15 drilling 3 counterboring 1 tapping 1 spotfacing	TOTAL 20	375 pcs./hr.	
	Water Pump Cover	6	12 drilling 2 milling 3 boring 2 chamfering 4 reaming 1 counterbore	TOTAL 24	177 pcs./hr.	
	Throttle Body for Four Barrel Carburetor	6	7 drilling 2 countersinking 3 spotfacing 6 reaming 1 tapping 1 milling 1 chamfering	101AL 21	375 pcs./hr.	

Morris provides "Special Machines"

...at a fraction of the usual "Special Machine" price!



These precision operations are performed on Morris Unit-Type Production Machines . . . at only pennies per part! Morris Custom Engineering Service develops the equivalent of a "Special Machine" . . . using standard basic and automatic drilling units . . . at a fraction of the usual "Special Machine" price!

This fast, accurate, production method may be applicable to your products. Write for information, or outline your production problem for analysis by Morris engineers.

THE MORRIS MACHINE TOOL COMPANY

934 Harriet Street

Cincinnati 3, Ohio

For more data circle 227 on Reader Service Card

# HIGH SPEED PARTS LIKE THESE?

Part	No. of Stations	<b>Operations</b>	Production
Refrigeration Compressor Crankshaft	12	10 drilling 1 gun drilling 1 chamfering 2 milling	121 pcs./hr.
Automatic Transmission Control Valve Upper Bedy	8	4 drilling TOTAL 3 tapping 10	188 pcs./hr.
Air Horn Four Barrel Carburetor	6	18 drilling 2 reaming 1 countersinking 3 spotfacing 1 tapping	375 pcs./hr.
Refrigeration Compressor Cylinder Housing	18	4 milling 19 drilling 11 burring 4 counterboring TOTAL 3 reaming 3 spotfacing 10 tapping 3 boring 1 chamfering	120 pcs./hr.



AIR-OIL-MATIC



Production Machine 18 station



#### Mr. Smith goes to Florida

Mr. Smith's books showed an excellent current ratio. His cash position was good; his surplus was substantial. Shortly thereafter, however, he entered a premature retirement.

He had overlooked the fact that a large part of his company's fixed assets were machine tools, and their values shown on his balance sheet were simply bookkeeping entries. Those values didn't reflect obsolescence, nor show how expensive indirect labor, nonproductive floor space and downtime can be.

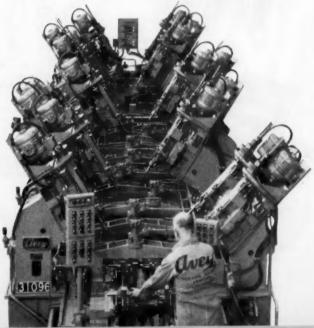
A closer look at your balance sheet may reveal the wisdom of investing in new production equipment. Its high rate of return makes good balance sheets better.

The 14-station machine has Line-O-Dex indexing, automatic hydraulic clamping and positioning, and drills ½ holes with Aveydraulic Torquematic deep hole drilling units.

When this order is complete, or the part changes in design, the Avey standard units can be rearranged for a new job an economical way to extend the life of your investment.

THE AVEY DRILLING MACHINE CO., CINCINNATI I, OHIO drilling, tapping, production machines





#### Hollow Mill Maker finds





Write For Copy of "CUTTING TOOL MATERIALS"

This 36-page illustrated booklet analyzes and compares types and covers grade selection for all major classes of cutting tools, etc., invaluable data for production men. Write for your copy today.

Address Dept. MS-81

The maker of these adjustable hollow mills required a steel that would give too performance in a variety of jobs—turning, tapering, facing, chamfering and trepanning. After thorough testing, Ludlum's high speed DBL-2 was selected.

DBL-2 is an improved general-purpose high speed steel. It contains tungsten, molybdenum and vanadium in such proportions that it excels 18-4-1 for most applications. DBL-2's unusual combination of high hardness with toughness, its ability to hold a fine grain over a wide hardening range, and the fact that it easily machines many diverse types of stock, made it particularly well suited for this job.

In addition to these advantages, DBL-2 can be heat treated in the same furnaces and atmospheres as 18-4-1 without fear of harmful decarburization. These DBL-2 blades were heated to 2250 F, oil quenched and drawn twice at 1025 F. After heat treatment, blades easily machined such stock as aluminum, stainless steel, carbon steel, aircraft steel, plastics, bronze, screw stock, cast iron and brass.

There is an A-L tool steel to meet your toughest requirements. Call your A-L representative or distributor today . . . or write Allegbeny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.

For complete MODERN Tooling, call Allegheny Ludlum



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+Use this Reader Service Card for requesting more information on products described and advertised +

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PERMIT No. 7414 NEW YORK, N. Y.

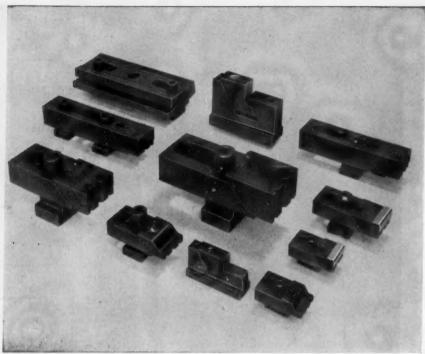
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machine shop

VILLAGE STATION
NEW YORK 14, NEW YORK



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# DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.



Faster Set-up with any of the 5 Models of J & S Jaw Clamps-one adjusting screw has a holding force of 21/2 tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled.

Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems-no interference with measuring tool readings.

See your industrial distributor or write today for free literature.



JAW CLAMPS - PRECISION VISES - BOWN-HOLDING DEVICES

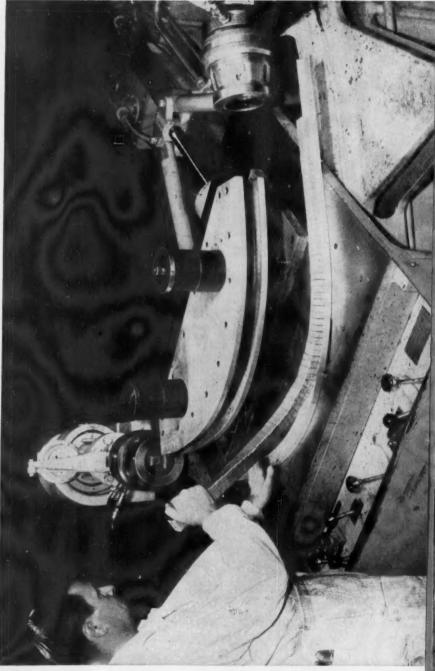
AMPCUT

TOOL CO., INC.

871 DORSA AVE. LIVINGSTON, NEW JERSEY

For more data circle 232 on Reader Service Card





TO THE RESCUE! Magnesium snake and tooling plate stretch-forming die has eliminated a lot of headaches for Hufford Machine Works, Redondo Beach, California. Galling, which causes scratching

and excessive wear in stretch-forming aluminum extrusions, is no longer a problem since the company switched to magnesium dies. Something else, too—tool costs were cut 20%!

# NO GALLING PROBLEM HERE!

Magnesium tooling plate solves this problem in stretch-forming aluminum

Latest development in stretch-forming — magnesium tooling plate. The number one reason is that magnesium's fine-grain, porosity-free structure and better slippage reduce galling to practically nothing.

Hufford Machine Works recently substituted dies made of magnesium tooling plate for the steel and aluminum ones they had been previously using. The result: the magnesium dies ran 500 pieces without showing wear and the aluminum extrusions showed no scratch marks!

There are other advantages to magnesium tooling plate. Light weight—one-fourth that of steel, one-third less than aluminum—makes magnesium dies much easier to handle

and use. Excellent rigidity, strength and dimensional stability are also magnesium characteristics . . . as well as outstanding machinability and weldability.

Ready availability and lower prices complete the magnesium tooling plate picture. It's a picture you should look into to solve your own tooling problems! For more information about magnesium tooling plate contact your nearest supplier of Dow magnesium, or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. MA 369M-1.

AVAILABLE FROM STOCK AT: Copper and Brass Sales, Inc., Detroit, Mich. • Fullerion Steel and Wire Company, Chicago, III. • Hubbell Metals Inc., St. Louis, Mo. • A. R. Purdy Co., Inc., Lyndhusty, N. J. • Reliance Magnesium Company, Los Angeles, Calif. • Vinson Steel and

you can depend on DOW MAGNESIUM — DOW





Knu-Vise offers rugged heavy-duty clamps, with solid bar or channel bar, and either hand or air operated, for all kinds of tough holding jobs.

In addition to their stand-up stamina for rough going, these Knu-Vise Clamps feature:

- 1-Easy and complete replaceability of parts
- 2-Hardened and ground bearing bolts
- 3-Minute adjustment of parts through self-locking nuts
- 4-Toggle Bars from C.R.S. Bars

Developments like these are typical of Lapeer engineering. More information? Write for catalog today on the models available.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

# KNU-VISE PRODUCTS

LAPEER MANUFACTURING CO.

3048 DAVISON ROAD

LAPEER, MICHIGAN

WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

For more data circle 235 on Reader Service Card

# Formbrite cuts polishing cost 50% for Fleuscreen

Bennett-Ireland, Inc., drops cutting operation completely, speeds buffing finds Formbrite also gives a more attractive, scratch-resistant finish.



Bennett-Ireland, Inc., Norwich, N.Y., previously used ordinary drawing brass for hearth fenders, kerbs, and frames in their famous flexible-metal fireplace screen ensembles. In polishing, the production rate was 12 frames per hour for the cutting operation and 4.5 frames per hour in the buffing operation.

When Bennett-Ireland changed to Formbrite", they found they could drop the cutting operation completely. And Formbrite's superior fine-grain finish speeded the buffing rate to 6.8 frames per hour. Thus the unit polishing costs for the frames were cut 50 per cent. Bennett-Ireland also found that

Bennett-Ireland also found that Formbrite forms readily with no rejections and that it resists scratching during forming and handling. The end result is a product with superior eye-appeal that will remain beautiful in the home through the years.

See for yourself: Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you make a better product at lower cost. Write for Publication B-39. Better still, ask about a sample or a trial batch. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

100 C S Per Of.

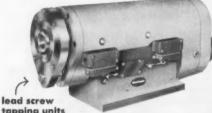
Formbrite

ANACONDA product

made by
The American Brass Company



For more data circle 236 on Reader Service Card



tapping units

Single-spindle or multiple-spindle, and, plain or flange quill mounting



revolving type heads

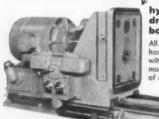
Mount vertical on any center-column machine with rotating chuck.



hydraulic index tables

38

Simple design-maximum safetycompletely hydraulically operated.



hydraulic drilling and boring units

All units have hardened ways. with cylinder mounted in bottom of unit.

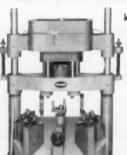




For Faster, More Economical Production

Here are a few typical examples of Heads, Bushing Plates, Fixtures, Automatic Index Tables, Hydraulic Drilling and Boring Units, and, Lead Screw Tapping Units used by Machine Tool Builders and Manufacturers. who insist upon the finest, when building or re-tooling.

We also build Revolving Heads for Chucking Machines.



multiple drill heads

Adapted for any type drill press and feed units. Shown with bushing plate and fixture.

We solicit your inquiries on any of your Multiple Drilling Problems.



DRILL HEAD CO. Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

For more data circle 237 on Reader Service Card



drilled
more efficiently
with Carlton
track mounted
radial drills

Special track mounting takes Carlton's drilling facilities up and down the entire length of even the longest beam. 10-ft. or 100. And Carlton's long arm reaches out over several beams.

Multiple beam drilling is but one advantage of these mobile Carlton radial drills which also offer—at no extra cost: 3-unit power clamping, low-hung drive, positive tooth feed clutch, and easy economical operation and maintenance. Made in five models and many arm and column sizes. Write for descriptive bulletins. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Carlton radial drills in arm lengths 3-ft. to 12-ft., column diameters 9" to 26". Also 4H and 5H horizontals.



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You can continue to depend on Logans for precision results. On every type of lathe operation Logan sustained accuracy keeps performance at top efficiency. Ruggedly proportioned as well as precision built, Logan Lathes keep their accuracy after years of use in tool room, shop or production.

Screw Cutting and Turret Lathes In a Wide Range of Sizes 9", 10", 11", 12" and 14" swing, all with Logan advanced design features.











10" swing, 1/2" collet 25/32" bore



9" swing, 1/2" collet 25/32" bore

See your Logan dealer, or write for catalog information.

40

LOGAN ENGINEERING CO. 4901 West Lawrence Avenue, Chicago 30, Illinois

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# **Talking About Die Sets**



Phil Marsilius Vice-President The Producto Machine Co.

Master or Commercial: What Makes the Difference? The most obvious difference between a Master (Precision) set and a Commercial set is the price. The Commercial set costs less because less assembly time is required in its manufacture. Punch holder and die holder tolerances are the same for both grades of die set. However, extremely close tolerances for fit between pins and bushings on Master sets require more accurate honing of bushings in assembly. Master die set tolerances for parallelism between punch and die holder are also more critical than those for Commercial die sets.

Normally, the difference between pin and bushing diameters on die sets manufactured by our industry is never less than .0002" and ranges as high as .0009" There are die sets made to closer or looser tolerances than these, but generally speaking, the majority of die sets fall into this category.

Master die sets are manufactured to the low side of this tolerance scale and are held to a maximum of .0004" differential. This closer tolerance increases the useful life of precision sets by allowing for wearing of the pins and bushings in operation.

Commercial die sets are made throughout the entire range of this tolerance scale and, more often than not (to reduce assembly cost), are made to the higher tolerances. As a result, their accuracy will usually decrease much faster than that of Master die sets. While it is possible with this tolerance range to receive a Commercial set with the minimum pin and bushing fit allowed, you can be certain of longer die set accuracy only with a Master set, which is guaranteed to be held to the low side

A "free-sliding fit" is one that permits the punch holder to move down on the guide pins of its own weight. It does not have any bearing on the degree of accuracy of the die set since a free-sliding fit can be supplied on both Master and Commercial sets. On Master sets, however, it is sometimes necessary to hone out the to the lowest tolerance for fit allowed),

A new catalog designed for you!

## WRITE FOR YOUR COPY TODAY

Here, at last, is a die set catalog that makes your selection and ordering really easy. Producto's all-new catalog is compact for the die designer, convenient for the purchasing agent, a functional tool for the die maker.

These unique features make Producto's catalog much easier for you to

IT'S COMPACT. Though many items have been added, it has fewer pages because superfluous material has been eliminated. New products include Owik-Fit Guide Pins, new Bushings with grease fittings, Lamina Bushings, Ring Punches and Dies, Toolroom Equipment, Lubrication Accessories and new Die Spring Selections.

IT'S COMPLETE, containing the greatest selection of die sets and accessories that has ever been offered to date.

ALL PRICES ARE NET and appear in a separate pricing supplement, removed from the technical section. No more time-consuming "discount" calculations.

NEW BINDING ARRANGEMENT lets you look at technical and pricing information simultaneously. No more flipping pages back and forth to get complete information.

STREAMLINED PAGE LAYOUT makes it easier for you to find essential data. Color highlights catalog numbers and drawings.

To make your die set ordering as painless as possible, write today for a free copy of Producto's new Catalog No. 11.



THE PRODUCTO MACHINE COMPANY 910 Housetonic Avenue, Bridgeport 1, Connecticut

erever die seta ere us

bushings to a full .0004" tolerance to provide a free-sliding fit.

EVERY die set MUST, of necessity, work freely in normal use, on the press, but catalog die sets should come apart and go together easily for bench work. With an occasional exception (when sets are made disassembly should be possible by hand without use of separating tools.

In making a choice, the degree of accuracy required and the life requirements of the die set should be the main points of consideration which determine whether you should order a Master or Commercial

For more data circle 240 on Reader Service Card

# it takes top cutter design to get best cutter performance!



# Special Form Development

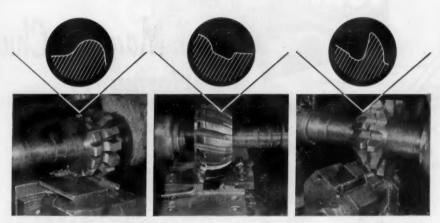
Special form-relieved cutters often allow several operations to be combined into one. Barber-Colman Engineers are experts in designing special tooth forms on form-relieved cutters for solving specific milling problems,

Our cutting tool division has the complete engineering, manufacturing and inspection facilities for making specially-designed form-relieved cutting tools of the finest quality. In addition to designing special forms, our engineers will design into the cutter such special features as axial side clearance, rake angles and helical flutes in any combination to produce maximum cutting efficiency. The best high-speed steel for the specific material to be cut is specified by our experienced engineering staff.

Barber-Colman form-relieved cutters require no "spot sharpening". Accurate face sharpening will maintain the correct form for the life of the cutter. This is true on all cutters including those with axial relief, rake or helical flutes,

# Application of Axial Relief

Surfaces which are in a plane perpendicular to the axis of the cutter, or nearly perpendicular, cannot be milled with a form-relieved cutter unless the cutter teeth are provided with axial side clearance. Barber-Colman can solve this problem by making the cutter with axial relief in one or both directions so that several cuts can be combined into a single milling operation. These applications show the proper use of axial clearance and helical flutes.



The form on this part has one side which is nearly perpendicular to the axis of the cutter, requiring a cutter with axial relief as well as radial relief. Both the axial and radial relief are formed onto the cutter tooth at the same time, and they are both applied to the complete tooth form. Consequently, the faces of the teeth can be sharpened without changing the tooth form. Helical flutes are provided to produce a shearing cut for improved finish and cutter life.

The form on this cutter is provided with both radial and axial relief because one small section of the form is nearly perpendicular to the cutter axis. Without axial relief, the perpendicular portion of the form would wear rapidly because of insufficient clearance. However, since the entire form has ample clearance behind the cutting edge, cutter life is greatly improved. Helical flutes eliminate any chatter during the cutting operation.

The workpiece in this application is tipped at an angle so that there is no undercut portion in relation to the axis of the cutter. However, in its cutting position, both sides of the form are nearly perpendicular to the cutter axis. The cutter is a two-piece interlocking type with axial relief in one direction on one side of the form, and in the other direction on the other side of the form. As the cutter is sharpened the form spreads apart, but the correct shape of the form is maintained. The proper dimensional relationship between the form is maintained by simply grinding the spacer between the two sections to the proper thickness.

These are only a few examples of the many special cutter problems passing through our Engineering Department daily. We welcome the opportunity to work with you in solving your production problems, and we invite you to send us part prints. Get top cutting efficiency through top cutter design.

# BARBER-COLMAN COMPANY

849 ROCK STREET . ROCKFORD, ILLINOIS

Hobs . Cutters . Reamers . Hobbing Machines . Hob Sharpening Machines



For more data circle 242 on Reader Service Card

# electrical controls for

Full Magnetic Chuck performance



PARALLEL

GRINDING

SHIMMING







# A CHUCK CONTROL

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. Chuck capacities: 50 to 15,000 Watts . . . 60 to 20,000 square inch chuck area.

# @ ELECTRO-MATIC RECTIFIER

Power conversion Unit, proved for dependable use with Magnetic chucks and other direct current equipment, from 50 Watts to 40 Kilowatts.

# O NEUTROLATOR HOLDING POWER REGULATOR AND CHUCK CONTROL

Provides regulation of holding power which permits grinding without shimming, to closer parallelism than ever before possible. In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial or push-button control provides regulation of holding power.

# D ELECTRO-MATIC A.C. DEMAGNETIZER

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.

The Best 1s None Too Good For Your Cutting Tools And Dies PRODUCTS CO.

2233 N. Knox Ave. Chicage 39, III. (U. S. A.) Telephone: BElmont 5-4010



... "Positive Duplication—offered ONLY by CINCINNATI (PD)" GRINDING WHEELS —is a remarkable achievement in precision manufacturing and quality control!"

And no wonder everybody's shouting the praises of CINCINNATI (PD) WHEELS. You can save money . . . and increase your production . . . when (PD) WHEELS are on the job. For through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

For complete details, see your CINCINNATI

(PD) Grinding Wheels distributor, or contact us direct. We'll be happy to send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Telephone (or wire or write) Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—only CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION



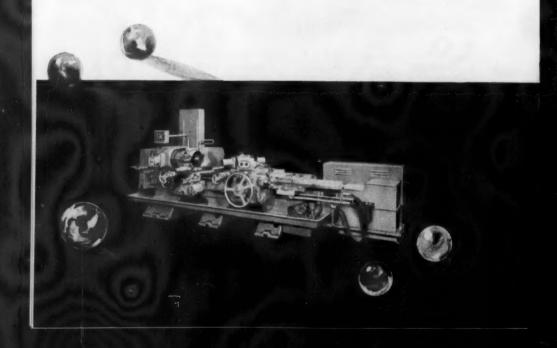
A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Trade Mark Reg. U. S. Pat. Off.

For more data circle 244 on Reader Service Card



# CHILD'S PLAY





Speed is not enough! To pay for itself out of reduced operating costs and increased profits, today's machine tool must be:

- 1. Easy to understand. 2. Child's play to operate.
- 3. Quick to convert in change-over and re-tooling.
- 4. Push-button simple to demonstrate in operator training.

Here are a few of the many advanced engineering features which have made today's Jones & Lamson machine tools the most flexible and cost-efficient metal cutting equipment in the industrial world today.

Two-way tracing combined with normal turret lathe operation; Hydra-clutch headstock and Geneva saddle for simple "on the machine" handling; Automatic handling, gaging, chip disposal, sorting, tool adjustment on single spindle automatics; Tape controlled turret lathes for flexibility on long or short run jobs with pre-set tooling, no hand controls; Thread and form grinders with fully automatic handling and machining cycles; Contour grinders controlled hydraulically or optically, and "Automatic thread chasing on standard turret lathes".



# JONES & LAMSON MACHINE CO - 521 CLINTON ST - SPRINGFIELD, VT.

**Turret Lathes** 

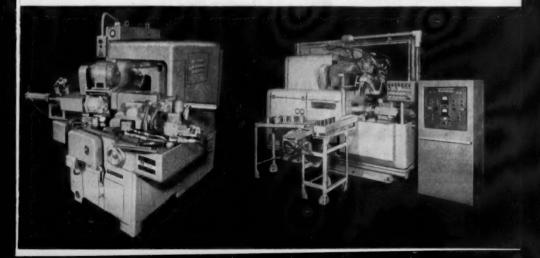
Fay Automatic Lather

Milling & Centering Machine

Thread & Form Grinders

Optical Comparators

Threading Dies & Chasers





# duMONT TOOL BITS COST LESS

because they

# LAST LONGER

because they are

# BALANCED

Clip the coupon below, see for yourself how a precise balance of toughness, red hardness and wear resistance can save you tool bit dollars.



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	Greenfi	eld,	Mass.	

MAIL FREE Tool Bit COMPARISON | CHART, CATALOG and PRICE LIST | S to

Name.....

Company.....

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# Meetings

Important Meeting
Dates

September 11-13 • American Die Casting Institute, Annual Meeting, Edgewater Beach Hotel, Chicago. Institute headquarters: 366 Madison Ave., New York 17, New York.

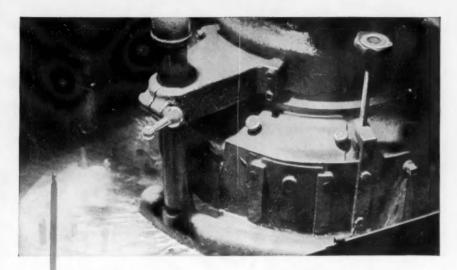
September 17-21 • Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Coliseum, New York. Society headquarters: 1319 Allegheny Ave., Pittsburgh 33, Pennsylvania.

September 21 • Cutting Tool Manufacturers Association, Fall Meeting, Lochmoor Club, Detroit. Association headquarters: 416 Penobscot Building, Detroit 26, Michigan.

September 24-25 • Steel Founders' Society of America, Fall Meeting, Greenbrier, White Sulphur Springs, W. Va. Society headquarters: 606 Terminal Tower, Cleveland 13, Ohio.

**September 25-28** • Association of Iron & Steel Engineers, Annual Meeting and Exhibit, Public Auditorium, Cleveland. Association headquarters: 1010 Empire Building, Pittsburgh 22, Pennsylvania.

October 1-3 • National Electronics Conference Inc., Annual Meeting and Exhibit, Sherman Hotel, Chicago. Conference headquarters: 84 E. Randolph St., Chicago 1, Illinois.



# for better grinding... **K-7**

K-7 gives superior results in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics (not recommended for non-ferrous metals). This all-chemical water soluble liquid concentrate is transparent and colorless in solution, is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. K-7 solutions do not load work wheels, and this means fewer dressings, longer wheel life and a true ground finish. Write for further details today.

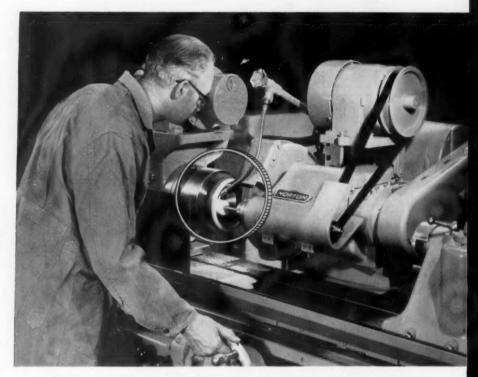


# F. E. ANDERSON OIL COMPANY INC.

BOX 216, PORTLAND, CONNECTICUT

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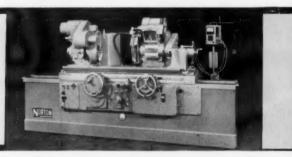
# Two new Norton Universal Grinders...



QUICK "GET-AWAY", one of the biggest advantages of the new Norton 14" and 18" Type U-4 universal grinders, shifts the time-and-money-saving "Touch of Gold" from one type of grinding to another — fast.

# NEW SIZES — NEW ADVANCED FEATURES

The popular Norton Type U-4 universal grinders are now built in 14" and 18" capacities. Note optional SWIVALIGN Unit on right of machine.



# 14" and 18"...feature <u>extra</u> versatility... <u>extra</u> fast set-ups...



Designed for external, internal, face and angular wheel slide grinding, Norton Type U-4 universal grinding machines—in the new 14" and 18" work capacities—bring you all the famous Type U-4 features. For example:

Extremely rapid chucking . . . quick change-over to live or dead spindle operation . . . easy work speed change . . . independent settings of wheel and feed . . . extra capacity in wheel head and headstock . . . precise swivel table alignment with the swivalion\* Dual Electric Indicator, an optional extra.

# PLUS these new advancements:

- Wide work speed range from AC power source with full horsepower over the entire speed range.
  - Steel-tape-type base way guards protect the ways and require

- no additional floor space.
- Wheel spindle runs in hard bronze bearings which enclose spindle and support over 50% of spindle body.
- Footstock spindle remains in retracted position for loading.

# Other Norton Universal Grinders

include the 10" and the Type U-4 12". You can depend on this complete Norton line of Norton universal grinding machines for speed, versatility and accuracy over the widest range of different grinding jobs. For complete facts see your Norton representative or write us direct. And remember: only Norton offers you such long experience on both grinding machines and grinding wheels to help you produce more at lower cost. Norton Company, Machine Division, Worcester 6, Massachusetts.

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

To Economize, Modernize with NEW



GRINDERS and LAPPERS

Making better products... to make your products better

District Offices: Worcester • Hartford Cleveland • Chicago • Detroit

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NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

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# NEW Grip-Tip CENTERS



Grip-Tip Centers are specifically designed to substantially reduce your replacement costs and machine down-time for regrinding or replacement of worn or chipped centers.

Male or female carbide tips are inserted or removed from the tool steel holders by simply turning a screw. The unique clamping action of holders on tips is positive and quick... you save replacement time with Grip-Tip Centers.

The life of Grip-Tip holders is practically unlimited, for, only the dull or chipped carbide tips are

reground. Because the steel holder is not ground when sharpening the carbide tip there is less clogging and longer life for your diamond wheels. Also, the relatively inexpensive double end tips in both male and female types can be stocked with a minimum investment . . . Grip-Tip Centers reduce tool and inventory costs.

Grip-Tip Centers increase your production by permitting full utilization of machine tools. It takes but a minute to remove old carbide tip and replace with a new one... machine down-time is less with Grip-Tip Centers.

For Further Information, Write to:

# DETROIT REAMER & TOOL CO

780 W. MAPLE RD. . P.O. BOX 174 . BIRMINGHAM, MICH.



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# modern machine shop

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Granville M. Fillmore, Vice President, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

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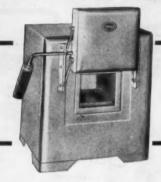
George E. Hay, 431 Main Street, Cincinnati 2, Ohio, MAin 1-0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

The Robert W. Walker Company, 2330 West Third St., Los Angeles 5, Calif., DUnkirk 7-4388; 57 Post St., San Francisco 4, Calif., SUtter 1-5568. California, Oregon, Washington.

\* \* \*

modern machine shop 431 Main St. Cincinnati 2, Ohio

# "Do-It-Yourself" Pays Off In Heat Treating



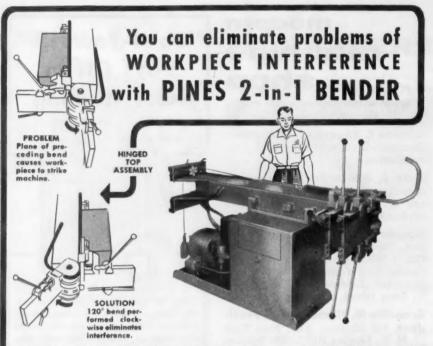
Why let someone else set your production schedules? If you now depend on outside heat treat sources, consider all the advantages of heat treating tools, dies, parts, etc., right in your own shop with a versatile TEMCO electric furnace. No bother with time-wasting pickup and delivery of work . . . no downtime while waiting for it to come back. Saves hours on jobs. Cuts costs . . . for TEMCO furnaces are economical to own and operate. Easy to hook up . . . easy to use. Eight models with chamber sizes from 4" x 334" x 34" to 91/2" x 81/2" x 18". \$60.00 to \$561.50 complete with controls. Write for data and negrest dealer's name.



# **ELECTRIC FURNACES**

Thermo Electric Manufacturing Co.
488 Huff St., Dubuque, Jowa

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# Pivoting Head Design Permits L.H. and R.H. Operation

● This new, small, compact Pines Bender for production, experimental, or small lot bending work is actually two machines in one. It's designed with a pivoting head and top assembly and double ways which permit fast, efficient handling of bending operation in either clockwise or counter-clockwise direction. Changeovers can be made in two minutes. You save time and reduce work handling where multiple planes and odd workpiece shapes cause interference on ordinary machines. These exclusive features permit double tooling setups, fast, accurate bending results.

# 300 - 400 Bends Per Hour

Typical production rates average 300 – 400 bends per hour, and the machine is powered to handle work up to 1" O.D., 16-gauge (.062") steel tubes, %" bar stock, or equivalent in continuous production. Economical tooling features make it an ideal unit for tool room or experimental department work as well as for medium production.

- DEPENDABLE HYDRAULIC OPER-ATION—complete self-contained system.
- HIGHLY VERSATILE—will bend tubing, bars, angles, channels, extrusions.
- ECONOMICAL TOOLING interchangeable for both R.H. and L.H. bends.
- COMPACT, RUGGED—occupies 3'6" x 8' floor space. Cast steel nose, heavyduty bearings.
- EASY OPERATION simple toggle clamping, convenient controls.



Write for complete data on this new Pines 2-in-1 machine or ask for a Pines sales engineer who will assist you with any bending problem.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabriceting Machinery 443 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING . DEBUREING . CHAMPERING MACHINERY

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54



# Specify these Taft-Peirce Tool Room Specialties

(Top row, left to right) Angle irons, large stocks of several styles and sizes; V-Blocks, cast iron and steel for milling, planing, grinding and Inspection; Box Parallels, sides parallel to within .00025" in 6", square to within .0005" in 6". (middle row) Cast iron surface plate with universal square and cylindrical square; Duplex bench block; Sine angle plate; 5" and 10" Sine Blocks. (lower row) Taper test fixture; Granite surface plate with 5" Sine Bar; and Comparator-Square with Cylindrical Squares.

treating mean much longer life, greater true value. T-P precision craftsmanship in grinding, assem-

> bly, and inspection assures unfailing accuracy on every set-up . . . a better part, or final product. And basic construction is so sound that many of these products are reground after extensive use for even longer life-value.

Remember, to get that extra cost-trimming value



## TAKE TAFT-PEIRCE

THE TAFT-PEIRCE MANUFACTURING CO. WOONSOCKET, R. I.

T-P Means TOP Precision



CARBIDE PLUG GAGES

TUNGSTEN CARBIDE wire type .016" to .500" dia.

TUNGSTEN CARRIDE taper lock type .500" to 1.510" dia.

In addition to its regular line of tungsten carbide wire type plug gages from .016" to .500" diameter, The Van Keuren Co. now offers a new line of tungsten carbide taper lock plug gages in the range from .500" to 1.510" dia. Van Keuren tungsten carbide wire type gages have proved their worth on thousands of tough gaging jobs. The new tungsten carbide taper

lock gages promise to be equally effective. They are offered in response to an insistant demand for T.C. gages in the taper lock range, and replace the chrome carbide gages previously offered.

Finish on VK gages in either the wire type of taper lock type in tungsten carbide will average .5 RMS or better. These gages are available in Class Y, X, XX and XXX accuracies at moderate prices and on a reasonable delivery basis.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 36 containing valuable technical and engineering information on measuring problems and methods. Address:



56

37th YEAR

175 WALTHAM STREET, WATERTOWN, MASS.



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# COLD FACTS about the HOTTEST IDEA in the history of coolants...

- [I] CIMCOOL° Concentrate has become, in just a few years, the largest selling chemical cutting fluid in the world.
- CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
- CIMCOOL IS CLEAN, doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Consult your CIMCOOL distributor. He'll be happy to tell you all about CIMCOOL—as well as the entire family of CIMCOOL Cutting Fluids. Or contact us direct. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

# CIMCOOL CUTTING FLUIDS

CIMCUT Base Additive—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds

°Trade Mark Reg. U.S. Pat. Off.

Permits the use and feeds.

CIMCOOL Bactericide—The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL Machine Cleaner — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

which still 'covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly

life amazingly.

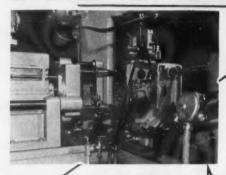
CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

RODUCTION PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO

# AUTOMATE



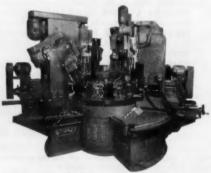
\*Your Metal
Working Operations
with WISCONSIN
Special Machines

Four-way special machine drills, reams, spot-faces and hollow mills lawn mower housings. Hand loading is followed by automatic clamping which starts the machining cycle.

Specially designed machines by WISCONSIN can help you automate your high production drilling, tapping, reaming, boring, spotfacing and milling operations. A few typical examples are pictured here. Write WISCONSIN today for complete information, or name of nearest representative.



Special four-way machine drills and taps several different sizes of V-4 engine blocks. Machine and fixtures are designed to utilize interchangeable fixed center drilling and tapping heads.



This special eight station machine drills, reams, spotfaces, taps and mills 3 different sizes of connecting rods for outboard motors. It features automatic clamping and utilizes adjustable spindle drilling and tapping heads at various stations.



WISCONSIN DRILL HEAD CO.

4983 N. 124th STREET

BUTLER, WISCONSIN

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A 8399-1/4 I

modern machine shop

September, 1956

# stop!

# HIGH BENDING COSTS

Multiple bending on Pedrick Production Benders can materially cut costs on all bending operations for pipe tube or structural metal.

Prove it. Write us your particular problem. Let us supply the cost-cutting answer in terms of pennies per bend. Pedrick Tool and Machine Co., Dept. 5, 3640 N. Lawrence St., Philadelphia 40, Pa.





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PEDRICK)

production benders

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don't lose a day ...

THE HOTTEST O.B.I.

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# without the spectacular facts

- Rugged, front to back crankshaft with huge crankpin
- Fully concealed, yet accessible, driving mechanism
- Enclosed, rigidly supported gearing operates in sealed oil bath
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- all-steel frame

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No overhanging gears, flywheel and other mechanisms

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Please rush new Bulletin 56 with all the facts on your brand new Series E Inclinable.

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26 FACT-FILLED PAGES

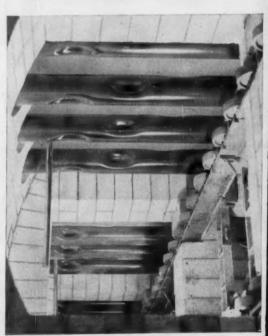


front-to-back crankshaft INCLINABLE PRESSES

America's Most Complete Line of Presses, Shears, Press Brakes, Other Machines and Tools for Plate and Sheet Metal Work

Whatever your source of heat...

# LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES





# ... IN INE GAS-FIRED FURNACE

# **NEW LINDBERG VERTICAL RADIANT TUBE**

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special protective coating gives greatest possible resistance to carbon penetration. Vertical position eliminates soot deposit and resultant temperature increases at points of sooting.

Tubes are 59 inches long, weigh only 29 pounds, changeable in a few minutes. No costly furnace shutdowns nor high labor and material cost for tube changes.

# ... IN THE ELECTRIC FURNACE

# NEW LINDBERG CORRTHERM ELEMENT CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available

CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available for heat treating furnaces. With this new element carburizing and carbonitriding with electricity becomes practical, efficient and economical. Ideal, too, in other types of Lindberg electric furnaces.

The outstanding feature of the CORRTHERM element is the extremely low voltage at which it operates. Consequently, leakage through carbon saturation and shock or short hazards are eliminated. Elements also act as baffles to direct circulation of convection streams.

CORRTHERM elements are practically indestructible. Work load or operator's charging tool can't hurt them. Watts density is at all time low. Easily installed or replaced, too, as element merely hangs in furnace and no complicated mountings are required.

Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.



LINDBERG ENGINEERING COMPANY

2469 W. Hubbard Street • Chicago 12, Illinois

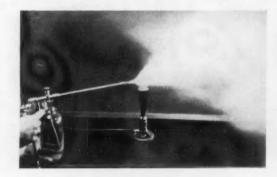
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# Announcing...the First

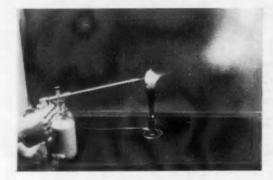
# HYDRAULIC

# Flame tests prove its fire-snuffing ability

This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.



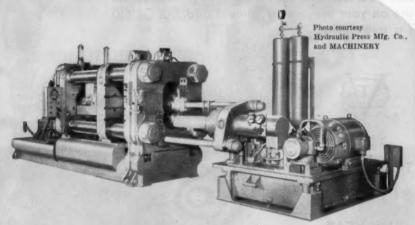
In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.



SHELL IRUS FLUID 902

# Oil-Base fire-resistant

# SHELL IRUS **LUID 902**



AFTER three years of intensive research, field application and evaluation, Shell Irus Fluid 902 is now commercially available for use in industrial hydraulic systems. While its cost is far lower than other fire-resistant fluids, its performance is comparable.

No major modification of equipment is necessary. Shell Irus Fluid 902 is a special formulation containing no corrosive ingredients . . . no adverse effect

on seals or fittings. It is a direct replacement for hydraulic oils now in service.

Noncorrosive, and nonrusting. Steel and copper panels immersed in Irus Fluid 902 for one week at 160°F have shown no significant signs of corrosion. Rusting has not been a problem in long-continued field tests.

This is an efficient fire-snuffing hydraulic fluid that can be widely used. Send coupon for details.

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SHELL OIL COMPANY or 100 Bush St. 50 West 50th St. New York 20, N.Y San Francisco 6, Cal. Please send me test data and information on Shell Irus Fluid 902.

Name\_ Company\_ Address\_

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# Holes JIG GROUND

with Vulcanaire

Provide yourself with this inexpensive\* instrument for use on your present equipment and JIG GRIND with a guarantee.



YOUR
TOOL ROOM
IN DAYTON
45th YEAR



A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton).

Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

\*Vulcanaire equipment pays for itself on the first job.

Borrow Vulcan's instructive movie on jig grinding

# Services of YOUR TOOL ROOM in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO





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25 Charter Oak Boulevard, West Hartford 1, Connecticut Branch Offices and Stocks in Principal Cities

MACHINE TOOLS . GAGES . CUTTING TOOLS

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# AIR-FEED AUTOMATIC

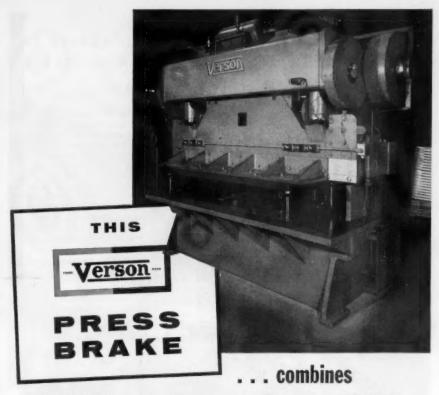
- Permits Greater
  Job Versatility
- 2 Easily Adapted To Multiple Feedouts
- 3 Provides Longer Stock Feedout
- 4 Eliminates
  Stock Scoring
- 5 Reduces Stock Reel Noise
- 6 Eliminates
  Stock Pushers
- Feedout Cams

Write today for Catalog A-405, or better still, have the Greenlee man call and show you the way to more profitable production with this machine.



GREENLEE BROS. & CO. 1889 MASON AVE. Rockford, Illinois

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#### multiple production operations for TEMCO

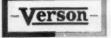
This Verson Press Brake accomplishes in one stroke all the jobs that formerly required several operations. Temco, Inc., Nashville, Tenn., manufacturers of gas heating equipment, uses the Verson Model No. 308 Press Brake to gang punch and notch corners and holes in flat sheet steel parts... speeding

the complete production process and reducing overall cost of operation.

If you now use press brakes, or are doing jobs that could be adapted to a brake, it will pay to investigate the cost-cutting opportunities offered by Verson Press Brakes. Write for Catalog B-55.

A Verson Press for every job from 60 tons up.





#### VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES . TRANSMAT PRESSES
TOOLING . DIE CUSHIONS . VERSON-WHEELON HYDRAULIC PRESSES

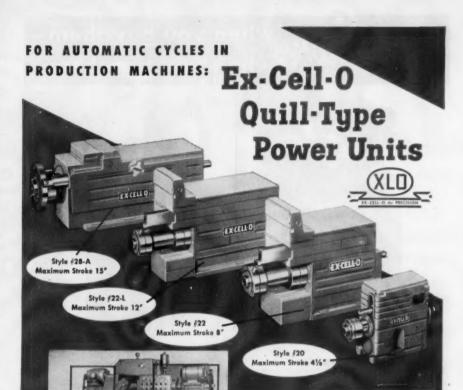
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INSTANTLY... precisely and in any desired quantity (no matter how small or extended a run) every change in contour is transferred from master piece or template to the cutting tool. It also controls the hydraulically actuated cross feed and the longitudinal movement of the carriage.

Changeover to standard lathe operation or back to tracer work requires only a few seconds without the addition or removal of any parts.





This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Hydraulic Power Units feed and rotate cutting tools in easily controlled automatic cycles. They actuate single tools or multiple spindle heads for such operations as drilling, reaming, counterboring and spot-facing. Hydraulic operation provides smooth, powerful movements.

Styles 20 and 22 Power Units can be supplied for step drilling, by means of which small, deep holes are drilled automatically in successive steps.

For complete information, including specifications and installation drawings, ask your Ex-Cell-O Representative or write Ex-Cell-O

#### EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS . GRINDING SPINDLES . CUTTING TOOLS . RAILROAD PINS AND BUSHINGS . DRILL JIG BUSHINGS . AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS . DAIRY EQUIPMENT

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# you Save when you buy them -



EXCEL No. 6

#### **CUTTER** and TOOL GRINDER

Low first cost plus savings in sharpening reamers, milling cutters, C bores and other tools make the Excel No. 6 a first-rate investment. With attachments, the No. 6 does internal and external grinding, too. Swings work 8" x 16". Get the details about the quality-packed Excel No. 6. Send for Bulletin M696.



EXCEL No. 7

#### HAND FEED SURFACE GRINDER

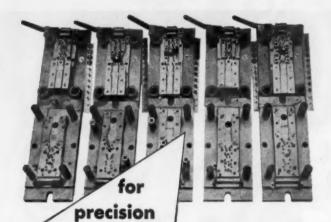
A low-cost precision machine that saves money on those small production runs and in the tool room. Grinds tools, dies, chip breakers, thread chasers accurately and fast. You'll find the rugged, easy to operate, easy to maintain Excel No. 7 a real asset to your plant. For details, send for Bulletin M796.

OVEL PRECISION |

BENTON HARBOR

HYDRAULIC & HAND FEED SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDERS

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jobs like this....Moore Jig Borers
and Jig Grinders are
"MADE TO ORDER"



NO. 2 MOORE JIG BORER. Range 10" x 16" x 16" height. Features infinitely variable spindle speeds, three power feed ratios, centralized controls.

NO. 2 MOORE JIG GRINDER.
Range 10" x 16" x 16" height.
Grinding speeds from 12,00
to 60,000 rpm. Infinite feeds
up or down; spindle-housing
heat control; features slot
grinding attachment.



- " 'HOLES, CONTOURS AND SURFACES' is bound to become a classic to the man or shop that does accurate work."
  - American Machinist Book Review 424 pages—\$5 U.S.A., \$6 elsewhere

Moore Jig Borers and Jig Grinders are made to order for jobs that require precision hole location—and plenty of it.

Take, for example, these five progressive compound dies used to pierce, shave, gut and blank intricate timing device parts.

Holes in punch plate and stripper were jig bored in a No. 2 Moore Jig Borer. Holes in the corresponding die parts were jig bored in the same precision machine, hardened and then jig ground in a No. 2 Moore Jig Grinder. Perfect line-up was insured, since all holes had to be held to ± .0002", both for position and hole size.

The No. 2 Moore Jig Borer, with its built-in system of accurate lead screws, can spot, drill, bore or ream all holes in a workpiece to "tenths" with minimum tool changes. The No. 2 Moore Jig Grinder can accurately contour grind, slot grind and form grind die sections in a third of the time required by other means.

These Moore toolroom teammates provide a one-two punch that can knock the fat off your diemaking costs. They supply an Engineered Hole Location Service that permits tool and die sections to be produced concurrently...puts diemaking on an interchangeable-parts-and-assembly basis...lengthens die life...seves you time and money all along the line.

Write today for our detailed literature that pictures and describes many toolroom and production jobs for which Moore Jig Borers and Jig Grinders are made to order.

MOORE SPECIAL TOOL COMPANY, INC. 730 Union Ave., Bridgeport 7, Conn.

#### ADD CTOOLROOM

ING BORERS - ING CRINDERS - PANTO-CRUEH WHIEL DRESSERS - DIE FLIPPERS - COMPLETE LINE OF HOLE LOCATION ACCESSORIES

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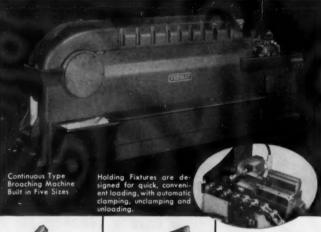
September, 1956

modern machine shop

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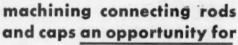












Surface Broaching



■ Surface Broaching is a modern machining method that in many cases shows reduced costs through higher production, finish to closer tolerance, and low tool maintenance costs. If you machine large quantities of duplicate parts we will be glad to work with you on the possibility of adopting Footburt Surface Broaching Machines. Send us blueprints and hourly production requirements for our recommendations.

THE FOOTE-BURT COMPANY

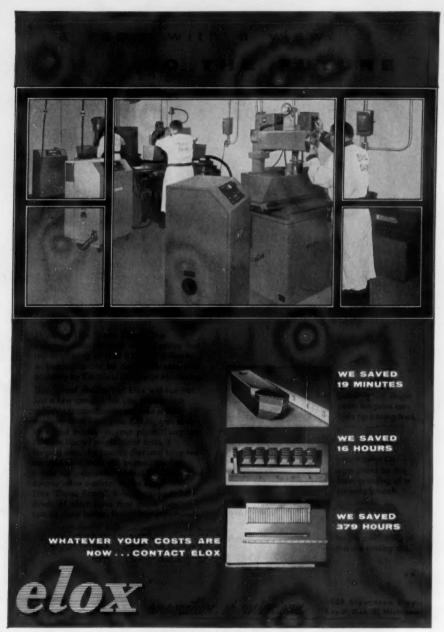
Cleveland 8, Ohio . Detroit Office: General Motors Building



# FOOTBURT

IONEERS IN SURFACE BROACHING

For more data circle 273 on Reader Service Card



For more data circle 274 on Reader Service Card

September, 1956

modern machine shop

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#### **NEW L&J NO. 7 PRESS**

RIGID - ACCURATE - EFFICIENT

- with a LARGER

WORK AREA



This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances. greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

Specifications: capacity 75 tons, standard stroke 4", strokes per minute 42 (non-geared 85), die space 14" to 22".

Write for Catalog
20 O.B.I. models — 14 to 90 tons



L&J PRESS CORPORATION
1624 STERLING AVE., ELKHART, INDIANA

For more data circle 275 on Reader Service Card

# TAPS by Card



ARD



Card taps, world-famous for over 80 years, are quality manufactured to meet your most exacting demands. Specify Taps, Gages and Dies By Card - for accuracy - low cost - top





GAGES by Canal

S. W. CARD MANUFACTURING CO., Mansfield, Mass. . Division of Union Twist Drill Company

\* DIES \* SCREW PLATES \* GAGES

For more data circle 276 on Reader Service Card

September, 1956

modern machine shop 77



#### BROWN & SHARPE—NELCO COMBINE SALES ORGANIZATIONS!

A milestone in metalworking will be reached on September 1st, 1956. when Nelco Carbide Tipped Milling Cutters will become available through the Brown & Sharpe Sales Organization, Complete inventories of Brown & Sharpe-Nelco standard cutting tools will be maintained in every metalworking center, and dependable "milk route" delivery of any Nelco cataloged Carbide or Carbide Tipped Tool as well as any of the complete line of Brown & Sharpe High Speed Steel Cutting Tools and Accessories can be expected.

#### ANSWERS DEMANDS OF AMERICAN INDUSTRY

Recognition of the demanding production schedules of industries has made this complete sales cooperation expedient. Overnight delivery of the finest, proven tools available today is a service industry has a right to expect. New machine tools, expanded production commitments, pressure on delivery schedules, demands for reliable tooling have all pointed up the need for a single, dependable, complete tooling source.

#### NELCO "SPECIAL" TOOLS AT

Carbide Tipped Face Mills, Slab Mills, Boring Bars, Special Is, Slitting Saws, Cutter Arbide Tipped Side Mills, Cutter Shell End Mills, Cutters, Carbide Tipped Side Mills, Solid Carbide Tipped Side Mills, Solid Carbide Tipped Side Mills, Solid Carbide Debars, and Forged Tools round out the Complete Nelco Line.

#### SALES, SERVICE, SATISFACTION GUARANTEED!

Two of America's foremost manufacturers, continually conscious of quality control, will now make the world's largest standard line of cutting tools for milling machines available to progressive metalworking plants both in the United States and through export channels. A standardization of quality tooling, both Carbide and High Speed Steel, will guarantee speedy service and nonpartisan sales recommendations with the right tools for the right application from a line of more than 3000 "standards!"

#### BROWN & SHARPE—NELCO PLEDGE QUICK SERVICE, GUARANTEED SATISFACTION

Over 3000 quality, expertly designed, engineered and "Industry Endorsed" Carbide, Carbide Tipped and High Speed Steel Cutting Tools will soon be available through the Brown & Sharpe—Nelco distributors. This represents the world's largest line of cutting tools and accessories, manufactured by two of America's most capable and respected manufacturers.

#### MODERN TOOLING, MODERN DISTRIBUTION!

Modern manufacturing methods, modern machine tools, increased production requirements demand improved tooling service. Brown & Sharpe and Nelco now make the most complete line of the best in cutting tools available to progressommunufacturers everywhere, for than ever before.

#### WC. LD'S MOST COMPLETE LINE OF CUTTING TOOLS & ACCESSORIES



#### SPECIALS, A SPECIALTY

Nation-wide distribution and tremendous production capacity guarantee expert attention and prompt delivery for all special cutting tool applications.

#### TREMENDOUS TOOLING TEAM

Remember: the best in cutter tooling is Brown & Sharpe and Nelco. The easiest and quickest to buy is Brown & Sharpe and Nelco. Remember this tremendous tooling team.

#### CATALOGS AND PHONE ALL THAT IS NECESSARY

One Brown & Sharpe Cutter catalog, one Nelco catalog and a phone are all that is needed to solve every cutting tool problem. Over 3000 of America's finest cutting tools are at your fingertips, saving anxiety—days of waiting—dollars of extra cost.



#### Which boring head will do your job?

CRITERION makes a wide range — 1½ to 7 inches in diameter. Bore accurate holes ½ to 20 inches.

CRITERION Heads feature widely spaced graduations — Easy reading — Accurate adjustment — Rugged construction — Dependable operation. Built for long life and chatter-free performance.



Ground shanks and adapters for all popular machine tools

BORING TOOLS

Boring, grooving and internal threading tools are stocked in

High Speed or Carbide.

80

RITERION TOOL PRODUCTS

> Select your boring head for ROUND or SQUARE shank tools.

**DIVERSIFIED OPERATION** 

Check the application of these tools on Turrets or Automatic Lathes.

MAXIMUM OFFSET TRAVEL
Save time—Money—Elim-

inate excessive tool change.

CRITERION MACHINE WORKS
765 WEST SIXTEENTH STREET
COSTA MESA, CALIFORNIA
Consult your dealer or write for free catalog.

For more data circle 279 on Reader Service Card

#### BEST VALUES U.S. A. NEW FEATURES . . . HIGH QUALITY . . . RADIAL DRILLS



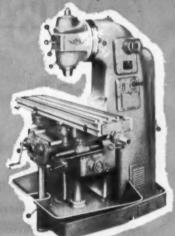


**OVERBECK** precision cylindrical grinders Sizes 1 9/16" o. D. x 43/4"

#### PEDERSEN Horizontal, Vertical, Combination MILLING MACHINES



\$2,595.

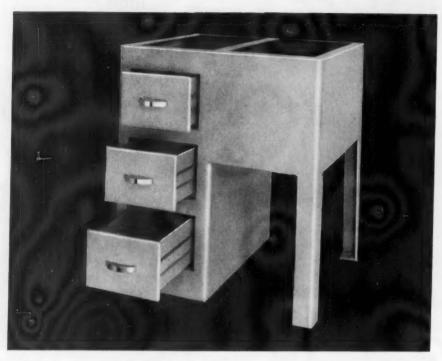


Liberal Terms . Rental Plans See page 309

\$6,490.

AARON MACHINERY CO. INC.

45 Crosby St., N. Y. 12, N. Y. . WAlker 5-8300 Branches at: Buffalo N.Y. Mineola N.Y.





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Machine bases, guards and pans. Littleford's complete fabricating facilities free your plant and equipment for your own manufacturing specialty. It's like finding a new building--with 175,000 sq. ft. of floor space, equipped for all kinds of metal fabricating. You'll welcome this additional capacity that'll keep your assembly lines rolling. And you'll profit from Littleford's experience. Send us your blueprints today for prompt and accurate estimates. Littleford Bros., Inc., Dept. LB-233, 433 E. Pearl St., Cincinnati 2, Ohio.

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These new Luers blades are held to precision tolerances on centrality and parallelism. Close tolerance grinding of all blade surfaces assures:

- Accuracy of blade size and complete blade interchangeability.
- 2. Centrality of head to shank held to close tolerance.
- 3. Better blade cutting edges, longer blade-life, smoother cut-off surfaces

In addition you get all the established features of the Luers design, such as: hollow ground top which results in free chip action and cooler operation; constant side and angular clearances; resharpening on front face only.

Standard Luers blades are available from stock in 4 grades of high speed steel and in 4 grades of carbide tips. Solid cast alloy blades are also available on customer order.

Made under license issued by John Milton Luers

8776 GRINNELL AVE.



**DETROIT 13, MICHIGAN** 

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# JOB FACTS

Plece-Differential case cover

Material -- Malleable iron casting

Operations—27 (16 on 1st operation work)—completing both ends of piece in single machine setup

Machine Time-30 seconds

Machine—8"RPA-8 Acme-Gridley Chucker arranged for double indexing



Write today for your free copy of 16-page illustrated bulletin CM-51A that shows and describes how Acme-Gridley 4, 6 and 8 spindle chucking automatics are designed to give you the maximum return on your investment.



# minimizes the importance of the decimal point... maintains automotive quality control

Continuous quality control, so basic to modern automobile production, was implemented by this manufacturer when he chose Acme-Gridley multiple spindle chucking automatics to perform 27 operations on the piece shown at the left. This not only let him do more operations in a single machine setup but, because of Acme-Gridley inherent design for sustained accuracy at high speeds and feeds, gave him decimal point accuracy that remained within control limits for check lot after check lot. Thus he prevents costly production bottlenecks, reduces scrap and maintains a balanced flow of parts to final assembly points.

# offione Agme

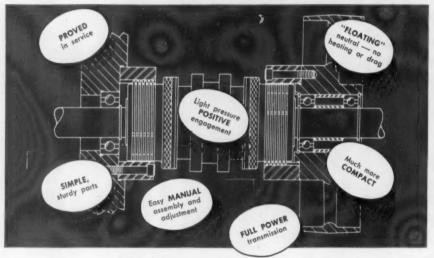
NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

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### PROVED SUPERIORITY OF A

#### MAXITORQ floating disco





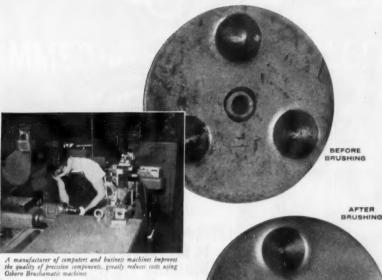
The line drawing shows typical application of a double Maxitorq Floating Disc Clutch, arranged for both drive and brake, with ring-type driving cups.

Such installations have a well-proved record of efficiency and freedom from maintenance. Drive and brake engagement and disengagement are smooth and positive . . . without drag or heating . . . because exclusive MAXITORQ design assures that discs ride free in neutral.

MAXITORQ Floating Disc Clutches are available in a wide range of sizes and types... single, double, overload release... to meet specific installation demands. Our engineering department also stands ready to help you solve special drive problems. Write or phone Dept. MM-9. The Carlyle Johnson Machine Company, Manchester, Conn.



For more data circle 285 on Reader Service Card



#### Low price on high finish



AFTER

A few years ago, precision parts were finished in custom lots at considerable cost. Today, Osborn power brushing methods put finer finishes on precision parts at mass-production rates

The business machine component shown above is typical. Brushamatic. Machines put a high, mirror-like finish on all flat and depressed surfaces of this ball retainer in just 25 seconds-finish 6 parts for the former cost of finishing 1

An Osborn Brushing Analysis, made in your plant at no obligation, will show how you can use Brushamatice methods to produce finer finishes at lower cost. Write THE OSBORN MANUFACTURING COMPANY, DEPT B-6, 5401 HAMILTON AVENUE, CLEVELAND 14, OHIO.

Isborn Brushes

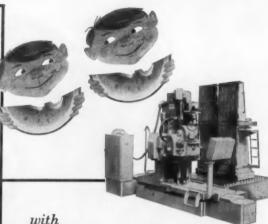


BRUSHING METHODS . POWER, PAINT AND MAINTENANCE BRUSHES BRUSHING MACHINES . FOUNDRY MOLDING MACHINES

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#### FAST Accurate DUPLICATION

... of any 2- or 3-Dimensional Shape



#### PRATT & WHITNEY KELLER

Automatic Tracer-Controlled Milling

#### MACHINES

A COMPLETE LINE FOR ALL YOUR DIE, MOLD, PROTOTYPE and PRODUCTION JOBS

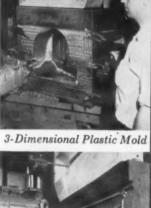
Built specifically for tracer-controlled milling. Quickly and easily handle complex, irregular shapes that cannot be machined conveniently by any other method. Do not need expensive attachments. Operate dependably year after year without frequent or costly maintenance. P&W Keller line includes:

TYPE BL 3620 . . . work size capacity 36" x 20". Made in single and 3-spindle models.

TYPE BG-21 . . . two standard capacities: 5' x 21/2'. and 6' x 4'. Single and 2-spindle models.

TYPE BG-22 . . . a big machine with capacities to 20' x 7'. Single and 3-spindle models.

WRITE FOR COMPLETE INFORMATION . . . outlining your requirements. Literature covering all P&W Keller Machines is available.





Large Wind-Tunnel Blade Die

#### RATT & WHITNEY COMPANY

INCORPORATED

25 Charter Oak Boulevard, West Hartford 1, Conn. Direct Factory Representatives in Principal Cities

MACHINE TOOLS . GAGES . CUTTING TOOLS

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# IMMEDIATELY AVAILABLE! HIGH SPEED 1-TON DENISON HYDRAULIC MULTIPRESS®

Industry's most versatile production tool ... gives up to 750 strokes

per minute!



- marking plastics, novelties, and leather
- assembling electronic parts
- trimming die castings
- plus assembling, marking, broaching, swaging, compacting

Gost \$39500 F. O. B. Factory

Delivery subject to prior sale



DENISON ENGINEERING DIVISION

American Brake Shoe Co.

Dept. 1246, Columbus 16, Ohio

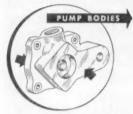
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September, 1956

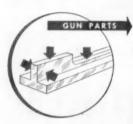
modern machine shop

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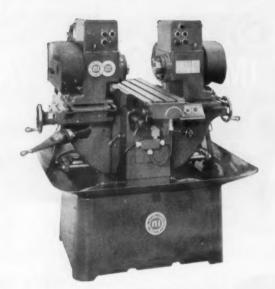












## on the NEW Nichols TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles TWO milling operations at a time, yet requires but ONE fixture and ONE operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility adup to increased output at lower cost. New Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. New Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFF-SET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

#### CONDENSED SPECIFICATIONS

Table, working surface	
Table, travel-cutting stroke	
Motors	
Maximum height center of spindle above table	
Maximum offset of spindles (horizontal)	
Maximum distance between spindle noses (across table)	
Floor space required	
Spindle Speeds (15)	from \$5 to 2050 R.P.M.
Manufactured by W. H. Nichols Co., 50-H Woord	Ave., Waltham 54, Mass.



Alse available are NICHOLS Hand Millers, NICHOLS twospindle millers with identical or opposed spindles, and with or without pneumatic feed.

Please address inquiries to

NICHOLS-MORRIS CORPORATION 76-H Mamaronsek Ave.

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# BUTTERFIELD

100% inspected for 100% performance

- · they cut clean
- · live long
  - · finish smooth

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UNION TWIST DRILL CO.
UTTERFIELD DIVISION
DERBY LINE, VERMONT, U.S.A.



#### OVER THE EDITOR'S DESK



#### GLIMPSE INTO FUTURE

A glimpse into the future reveals exciting and unlimited possibilities in the development of new production techniques, new metals and new uses for materials, according to D. S. Harder, Ford Motor Company manufacturing executive.

Mr. Harder, executive vice president — basic manufacturing divisions of Ford, recently described several innovations which could significantly improve manufacturing processes for the automotive and other industries

One research subject he noted envisages the use of a neutral white automotive paint containing photosensitive pigment, which could be colored by using a controlled electro-magnetic radiation gun.

Strides in improving the steel-making process could lead to continuous casting of slabs as molten steel is taken from refining furnaces—eliminating several stages now necessary, Mr. Harder said. The use of aluminum for such items as automotive radiators and applications of alloys and synthetic materials are being studied to save weight, conserve critical materials and improve quality.

He said progress in automation,

involving use of magnetic tapes to control machine tools, will enable greater quality production than ever before. He stressed, however, that such "electronic brains" will increase the need for technicians and more highly trained employees and that fears of automation displacing masses of workers are unrealistic.

Other manufacturing ideas cited by Mr. Harder as holding great promise include pressure-molding of iron and steel into complicated and finished shapes; new plating alloys; cold extrusion — moving metal to form a part rather than removing it by machining; bonding techniques which involve magnetizing molecules of metals; electronic systems for moving materials and finished products within plants; and shipment of raw materials, such as coal, hydraulically through pipe lines.

Manufacturing plants of the future may not change radically in appearance, but many maintenance problems may be eliminated by use of stronger materials with greater rust and corrosion resistance, Mr. Harder commented. Other prospects include development of new soundabsorbing materials, conversion of the sun's energy into radiant heating



FOUND WHERE AIRCRAFT POWER AND CONTROLS TAKE SHAPE



FORD INSTRUMENT COMPANY DIVISION OF SPERRY RAND CORP

Bendix BENDIX PRODUCTS DIVISION BENDIX AVIATION CORP

PRATT & WHITNEY

With these built-in precision features typical of all Grand Rapids Grinders, it's no wonder they're found in leading toolrooms.

125 fpm.

most in precision grinding.

Precision is paramount in the manufacture of components for dircraft power and control. That's why these makers of precision parts have Grand Rapids Grinders in their toolrooms—for the ut-

Model No. 55, for example, features one-piece column and base for perma-

one-piece column and base for perment vibrationless rigidity. Longitudinal travel table and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. And it's faster than any other grinder of this type and aise, with variable table speed up to

A note on your let-terhead will bring full details.





SUPER SABRE F-100 NORTH AMERICAN AVIATION, INC.

GRAND RAPIDS No. SS HYDRAULIC PEED SURFACE GRANDER. Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for lile. Spindle speeds 1925 and 2500 rpm.

GALLMEYER & LIVINGSTON COMPANY

408 Straight Ave., S.W., Grand Rapids, Michigan

GALLMEYER

LLIVINGSTON

OVER THE EDITOR'S DESK . .



for plants and extensive use of television for such activities as guarding plant properties.

#### GOVERNMENT-INDUSTRY RELATIONS

No single problem in the field of government procurement is of greater current significance to defense contractors than the problem of acquisition by government contract of manufacturers' proprietary technical data or know-how. This subject, which has given rise to widespread misunderstanding and concern over governmental intentions, is the subject of a recent MAPI pamphlet entitled "Proprietary Manufacturing Know-How and National Defense Requirements."

The issues discussed in the pamphlet go far beyond technical matters of patent and copyright law. In the language of the foreword they go "to the heart of government-industry relations, efficient and economical procurement and the essence of free enterprise as it is grounded in encouragement of individual initiative, property rights and research and development and appropriate reward therefore."

Quite aside from the immediate effects on present government contractors of defense policy, the implications of that policy are of concern to all American industry. Individual copies of the pamphlet are available without charge upon request to MAPI, 1200 Eighteenth Street, N. W., Washington 6, D. C.

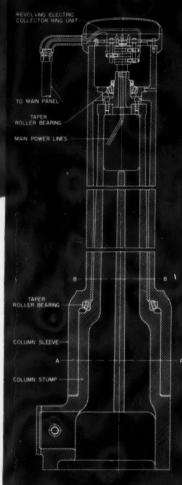
#### STRONGEST LOYALTY

Following World War II, the Army undertook the task of determining why 640,000 able-bodied men became totally useless. Its findings were then used to design a course of leadership training for the officers at Fort Benning.

The Army psychologists learned that in battle a man's motivations are stripped away, one by one, until a hard core which transcends the love of Old Glory, or hatred of the enemy, or personal pride, is reached.

What is this hard core? What is it that gets a man on his feet, drawing on some last ounce of courage and strength when he has reached the breaking point? The Army says that the core or the very last thing is loyalty to a particular individual; an officer; or his buddy, or to the men in his platoon. When nothing else is left, a soldier will still fight and face death rather than suffer the feeling that he let "the other guys" down.

The business executive, like the supervisor who really gets results, manifests a personal interest in his people and he makes them feel secure. He makes them want to take responsibility rather than let him carry the whole load. He holds up the challenge that tomorrow can be better than today so that they see opportunity ahead. The key men then give completely of themselves in making reality out of possibilities.



New thrust resistant, "TIMKEN" mounted column and sleeve assembly.

Write for Bulletin No. 328 for the complete story of More and Better Work at Lower Cost.

#### Rigidity Increased

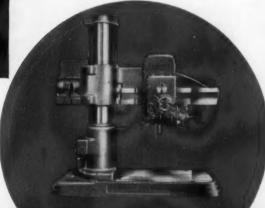
50%

The new "TIMKEN" mounting of the column and sleeve on the new model 32-speed Hole Wizard Radial has hit the "jack-pot" for rigidity. It's the stiffest, most resistant column unit we've ever known.

Under drilling tests up to 30 horse power deflection has been cut in half over former models. It's truly a marvel of rigidity.

Large Timken bearings at top and bottom when preloaded bind the column and sleeve into the equivalent of a solid unit for resisting functional stresses and cuts arm deflection to an absolute minimum. This definitely results in greater accuracy and longer cutting tool life. To further increase resistance to stresses the column sleeve departs from conventional design by employing a tapered inner wall providing an unusually heavy section where the greatest functional stresses are concentrated.

A new "NON-CREEP" clamping mechanism in combination with a solid column sleeve cuff adds greatly to the rigidity of this new "AMERICAN" Radial.



THE AMERICAN TOOL WORKS CO. Cincinnati 2, Ohio, U.S.A.

LATHES AND RADIAL DRILLS

For more data circle 291 on Reader Service Card



#### YOUR OWN BUSINESS

A new booklet to help prospective business men entitled "So You're Going Into Business . . . ," is aimed primarily at the man who plans a small retail establishment. Published by the Chamber of Commerce of The United States, the publication cites lack of management know-how and experience as the prime cause of business failures. The booklet's initial function is to cover some of the more important points that need forethought before a man goes into business for himself. These include personal aptitudes and experience. selection of proper location for a new business, estimating costs and the amount of capital needed, and the question of whether to buy, rent or start from scratch.

The booklet also provides a reference list of organizations and publications helpful to the prospective business man, and explains how chambers of commerce, trade associations and government agencies can be of assistance

The book points out that there is a connection between giving honest value and success in business; that lasting success comes only from playing fair with the public and being a credit to the community.

A copy of "So You're Going Into Business . . ." is available from the Domestic Distribution Department of the Chamber of Commerce of the United States, Washington 6, D. C.

#### Letters to the Editor:

#### **Throw-Away Tools**

Could you send us information on the metal cutting tool bit known in the metalworking field as the "throw-away" type?

> Walter W. Cowhig, Development Engineer Allied Machinists of Waltham 6-14 Water Street Waltham 54, Mass.

• List of companies sent.—Ed.

#### Handles

Please send us the names of companies who are in a position to supply standard plastic or other handles of various types.

> Harry W. Knoll, President H. B. Rouse & Company 2214 North Wayne Avenue Chicago 14, Illinois

• List of companies sent.—Ed.

#### **Sensitive Drills**

In a research study upon which I am currently engaged, I am seeking production and distribution statistics covering the sensitive drilling machine industry. If you have compiled any data which might be useful in my study, or if you can suggest some other appropriate sources, I should be most grateful to you.

Paul Wasserman, Associate Professor Graduate School of Business Cornell University Ithaca, New York

• In addition to taking a look at the enclosed material I would suggest that you also write to Mr. Ludlow King, Assistant Vice President, National Machine Tool Builders' Association, 2071 East 102nd Street, Cleveland 6, Ohio.—Ed.

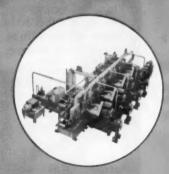
#### Another Natco® Shipped on Time

Delivery schedules of capital goods such as large, high-production machines present problems for machine tool builders. At Natco these problems are as serious as with any builder. But Natco's current record for on-time shipment is remarkably good . . . 86% either on achedule or better than schedule.

And we're not stopping there... we are adding 50% more production capacity to further improve our delivery schedules.

Production schedules of consumer products also present serious problems. With modern, high-production, cost-saving machine tools, many perplexing production schedules become routine.

Call in a Natco Field Engineer to discuss your next production problem. You can count on his recommendations and his delivery promises.



Natco Holeway® transfer machine turns and faces 120 cylinder blocks per hour.



Multiple spindle drilling, boring, facing and tapping machines. Special way-type, index and transfer machines.

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NATIONAL AUTOMATIC TOOL COMPANY, INC. Richmond, Indiana

NATCO

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan

#### OVER THE EDITOR'S DESK . .



#### **Design Services**

We would like to receive a copy of the article "Using the Services of an Outside Design Firm." If there is any charge for this article, please let us know and we will be glad to forward our check to cover it.

> Gilbert F. Beaudin, Engineer Northeast Engineering, Inc. 55 Millbrook Street Worcester 5, Mass.

• Tearsheets of article from December 1954 issue sent.—Ed.

#### Information Please

Is it possible for you to supply me with the correct address of the Star-co Mfg. Co. who are located in Florida and who manufacture and market a grinder fixture called Sine-A-Dex for use on a surface grinder?

John Wm. Schukraft 1213 East Belvedere Ave. Baltimore 12, Maryland

Can you help us to locate the name and address of the manufacturer of a small Drill Press Vise which is sold under the trade name of "Mardo"?

Frank Dattalo Oliver Brothers, Inc. 421 Canal Street New York 13, N. Y.

• These two requests have us stumped for the moment. We'll be most grateful to any reader who can supply information.—Ed.

#### **Training Material**

There is an article on Page 94 of the July issue on Supervisory Security concerning material on a supervisory training program package by the Mutual Benefit Life Insurance Company, Newark, New Jersey. Further information concerning this program would be appreciated.

> A. A. Bibee, Chief Materials and Process Engineer Douglas Aircraft Company, Inc. El Segundo, California

• Your request has been forwarded to Gordon Hull, Director of Sales Services at Mutual Benefit Life Insurance Company. You should hear direct from Mr. Hull shortly.—Ed.

#### **Epoxy Dies**

Would you be kind enough to furnish the undersigned with a reprint of the article "How to Make and Repair Epoxy Dies"?

G. Paul Hughes Welded Products Division Thompson Electric Welder Co. Bay City, Michigan

• Tearsheets of article from January issue sent.—Ed.

#### **Machining Economics**

I read with interest the article "Machining Economics," which appeared in the May 1956 issue of "Modern Machine Shop."

I should be obliged if you would give your kind attention to the following observations I made:

In Fig. 4 of said article ought to be indicated the following four curves:

- (1) Cost of loading, rapid advance, rapid return, etc.
- (2) Cost of metal cutting

# for every metal cutting problem Regular Metal Cutting • Skip-A-Tooth • Friction Cutting



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- . Try our Wavy Set for cutting angle iron, tubing and thin materials



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(3) Cost of changing and sharpening cutter (a)

(4) Total cost per piece

However, the third curve is miss-

ing in Figure 4.

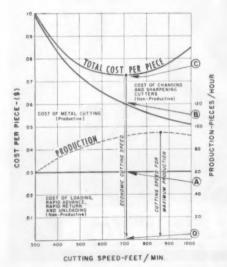
At the same time as the points of the total cost curve are obtained by adding the ordinates of the curves 1. 2. 3. for each abscissa, as e.g. the minimum value for the 700 feet/ min. abscissa should be as follows:

(1) Cost of loading, rapid advance, etc. .\$0.03

(2) Cost of metal cutting .....\$0.06

(missing) (3) Cost of changing and sharpening . . . . . . .

Total: \$0.09 ÷a



However, according to Fig. 4 this total amount is about \$0.073.

As many people are not conversant with the methods of plotting the total cost curve, perhaps they do not understand how "these three blocks of input dollars are superimposed" in obtaining the "upper curve."

Don't you think it useful to give some additional explanation?

J. Sacristan Pza. Luca de Tena, 10 Madrid (Spain)

- Concerning Mr. Sacristan's letter, it seems the source of confusion is in the interpretation of the scales used in the diagram. Instead of these "three blocks of input dollars. . . ." being superimposed, they are actually imposed one on top of the other. Taking the conditions mentioned in Mr. Sacristan's letter, the cost computation should run as follows:
  - (1) Cost of loading, rapid advance, etc. . . . . . (OA) \$ .03
  - (2) Cost of metal cutting ....(AB) .03
  - (3) Cost of changing and sharpening .....(BC) .013

 $Total\ (OC = OA + AB + BC)$ : \$ .073

I think between the re-lettered diagram and the above additions, this should help.—Joe H. Crawford, Research Engineer, The Cincinnati Milling Machine Company, Cincinnati, Ohio.

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JACKS

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#### FEATURES II

#### CHEMICAL MILLING . . . A NEW SHOP HORIZON

By Manual C. Sanz

This article discusses a new technique, developed by the Materials Research and Process Group at North American Aviation, for the purpose of producing any desired shape of part from various alloys by etching. The several illustrations included with the article show typical parts produced with this process, as well as the equipment used in employing same. Page 104.

#### HOW BURROUGHS SAVED A MILLION DOLLARS By N. O. Baylis

The discussion covers a Work Simplification program which began at the Burroughs Corporation over three and one-half years ago and which has proven to be an important and permanent part of the organization, Page 114.

#### AUTOMATIC DRILL FEEDS SPEED PRODUCTION By Gilbert C. Close

At the General Pacific Corporation, Los Angeles, California, one of the nation's largest manufacturers of fire extinguishing equipment, automated drill presses play an important role in the highspeed production of equipment. Page 122.

#### BENCH-VISE FIXTURE FOR HOLDING V-HEAD SCREWS

By W. M. Halliday

The author discusses a simple bench-vise fixture which is designed to permit the threading of V-head screws practically up to the heads of the screw. Page 128.



SEPTEMBER 1956

#### THIS ISSUE

#### THE QUEST FOR THE ONE BEST WAY By W. A. Nordhoff

In this installment, the author concludes his discussion of the many factors which influence the cost of a product and which frequently are beyond the control of an operator. Subjects covered include cutting tools, jigs and fixtures, materials, design consideration, planning and shop suggestions. Page 134.

#### GEAR BLANK TURNING FACILITATED BY USE OF PIN-TYPE ARBORS

The Frank G. Hough Company, Libertyville, Illinois, has simplified the task of maintaining precision in turning gear blanks, and has also increased production by 10 to 15 per cent while making the machinist's job easier through the use of pin-type arbors, made by Scully-Jones and Company of Chicago. Page 154.

#### MACHINING STAINLESS STEEL

#### By G. J. Stevens

This case history points out how the use of a larger carbide bushing insert solved a Swiss automatic machining problem on stainless steel.

Page 158.

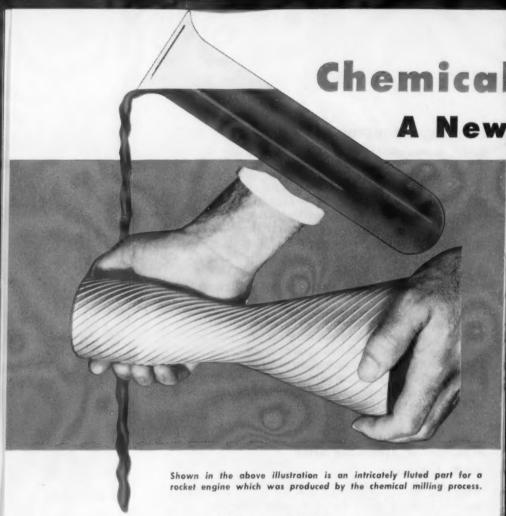
#### ESSENTIAL ELEMENTS OF THREAD AND FORM

#### By Clifford T. Appleton

In concluding this three-part article, the author discusses the design of blanks to be thread rolled, as well as typical applications of the thread rolling process. Page 162.

VOL. 29 NO. 4





MANUAL C. SANZ

Materials Research and Process Development Group Leader. Missile Development Division, North American Aviation, Inc., Downey, California Plant

In the missile development division at North American Aviation's Downey, California plant these days, hundreds of solid metal parts are being designed that defy all efforts to machine them. Some of these parts are of metals, such as the various titanium alloys, that just won't machine easily. Others are of such odd shape that no known machine setup would produce the necessary contours. Yet all of these parts are being produced by the simple expedient of dipping them into a chem-

# Milling Shop Horizon

New technique produces any desired shape part from various alloys by etching.

ical solution and etching them to the proper shape.

This technique is known as the "Chem-Mill" process. It was researched and developed by the Materials Research and Process Group at North American Aviation for the purpose indicated above — to produce parts that could not be produced by conventional shop machines, or that were too costly to produce by conventional methods. In application, chemical milling acts to extend machine shop production facilities.

not to compete with the machines already in use. It provides new freedom for the design engineer in that he can now specify shapes, contours, and materials that heretofore could not be handled by available machine shop equipment.

Although there is still much to be learned about it, and many process improvements to be made, chemical milling is well past the experimental phases. It is now being used to produce more than 170 specific parts for North American Aviation's super-





Group of parts being lowered into etching solution during chemical milling. Note masking film and cutouts. Edges need no masking when parts will be cut from sheet after etching.

"... chemical milling is said to produce parts that exceed the practical limits of conventional machine shop equipment."

sonic F-100 "Super Sabre" military fighter airplane. Other hundreds of parts are being produced for the company's missile development program. Among several patents already issued, there is one on the basic process issued to North American Aviation in the name of the author of this article. Many other patent applications are pending in the name of North American Aviation or Turco Products, Inc., of Los Angeles. Arrangements have been made with Turco Products to sublicense the process to other manufacturers. To date, more than 30 large companies, mostly in the aircraft and missile fields, have availed themselves of its use.

Both North American and Turco Products are operating experimental facilities for improving the process as used on aluminum, Turco Products has also installed a pilot line to experiment in the production of steel and titanium parts by chemical milling. Intensive research is being conducted to develop better methods of masking parts, better etching solutions, and better methods for solution maintenance and control. But these efforts toward improvement are anticlimatic and normal to any industrial production process. Today, chemical milling is a "going" process, producing parts

that are said to exceed the practical limits of conventional machine shop equipment.

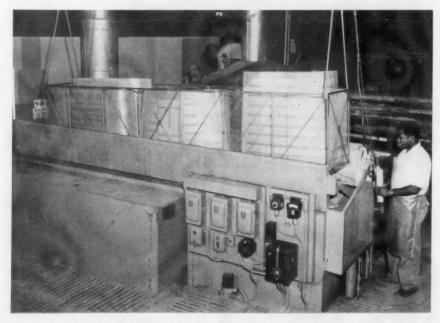
The basic principle of chemical etching is as old as the knowledge that certain chemicals would eat away, corrode, or combine with certain metals when the two were brought into contact. The present process involves steps of forming a metal sheet, and then masking and etching it in a predetermined pattern to provide improved strengthweight characteristics. The further development of the novel "Chem-Mill" process hinged on the development of methods to control this chemical reaction so that only the desired portions of the blank metal part would be attacked, and so that the etching action would progress at a predeterminable rate, thus making it possible to remove the part from the etching solution after the proper amount of metal had been etched awav.

The first part of this control problem is solved by spraying or dipping a masking solution on the surface of the part to be chemically milled. This solution dries into a thin film which is chemically resistant to the etching solution to be used, but which has very little adherence to the metal and can be stripped away by hand. Next, a template corre-

# "... metal is removed at the rate of 1 mil (0.001 inch) per minute of immersion in the etching solution."

sponding in size and shape to the area of metal to be etched is superimposed on the masking film. A knife is used to scribe around the template, cutting through the masking film. The cutout area of masking film is then stripped away by hand, and the part is ready for immersion in the etching solution. It should be pointed out right here that the template used in scribing the cutout is sufficiently undersize to allow for undercut etching of the metal along the edges of the masking film cutout. This undercutting will be equal to the depth of metal removed from the unmasked areas.

The second part of the problem—controlling the speed of etching, or the speed of metal removal at a predetermined rate—is accomplished by adjusting and maintaining the strength and temperature of the etching solution, and by constant agitation of this solution so that all surfaces to be etched are attacked evenly. The rate of etching, largely because it is compatible with the



A group of chemical milled parts is shown in the process of being lowered into a drying oven by operator after final rinsing and removal of the masking film from the parts.

handling equipment in use at this time, has been established so that metal is removed at the rate of 1 mil (0.001 inch) per minute of immersion in the etching solution. This is fast enough to limit the length of the etching process to a reasonable time, vet slow enough so that metal is not removed unevenly (enough to exceed an established tolerance) while the work is being lowered into or raised from the etching solution. The strength of the etching solution that wets the surface of the part after it is removed from the tank is dissipated almost immediately, so immediate rinsing following removal is not critical.

With the above basic facts as seed for thought, any imaginative design engineer or machine shop operator will begin to visualize what chemical milling is offering to industry at large. To begin with, by in-process masking or mask removal (after the etching process had progressed for a predetermined time) different amounts of metal can be removed from different areas of the part. A number of similar parts can be etched at one time all scribed on a single large sheet of metal, then cut apart after etching. Lightening holes of any size, shape or depth can be etched through or into the part after it has been formed or otherwise fabricated. When a certain thickness of metal is required to provide proper metal flow during forming of a part, the excess metal can be chemically milled away after forming.

Flat parts can be chemically milled on both sides at one time. Parts that are conventionally strengthened by "welded-on" or "ri-



A chemically milled sheet of aluminum with integral stiffening risers. Prior to chemical milling, the risers would have been spot welded or riveted in place. This particular part was etched after it was formed.

veted-on" doublers can be made from thicker material, then an integral doubler formed by etching away the metal between the doubler locations. Tapered parts with exceptionally close tolerances can be chemically milled by lowering the part into the etching solution, then lifting it out at a predetermined rate, allowing the etching solution to act progressively longer on the portion still under the surface. A conical taper, or even a perfect semisphere, could be milled by a predetermined but varied rate of withdrawal. Patented apparatus with mechanical hoists are already available that will automatically provide a varied or steady rate of part immersion or removal. Sheets of metal up to the size of the etching tank can be tapered by this method, or can be given a two-way taper by placing them into and removing them from the etching solution at a predetermined angle.

Chemically milled parts are already being used to replace odd"... parts now being chemically milled in a single piece were formerly fabricated from several mechanically milled components."



Manuel C. Sanz (left), inventor of Chem-Mill Process, checks a chemically milled sheet with Don C. Atkins, Jr., supervisor of research and development in Turco's Chem-Mill Division.

shaped forgings with a saving of both time and money. This is especially true on prototype forgings to avoid the long wait while the die is developed and the first forging made. In addition, many parts that are now being chemically milled in a single piece were formerly fabricated from several mechanically milled components.

The diagram with this article illustrates a basic chemical milling installation. Modifications can be made to suit the individual installation. Such a system is largely com-

posed of solution tanks and conveyor devices for handling the work through the tanks. Space requirements are much less than would be required for mechanical mills to turn out the same volume of work. And the cost of this type of equipment is comparatively very low. If more than one type of metal is to be chemically milled, the only additions to the system required are separate tanks for the purpose of holding the different etching solutions.

The new line at Turco Products, Inc., for chemical milling of steel and titanium, occupies less than 800 sq. ft. of floor space. The tanks will handle parts up to 3 ft. by 4 ft. in size.

Steel, aluminum, magnesium, and titanium alloys are being successfully chemically milled at this time. Caustic-type etchants are used on the aluminum alloys, and acid-type etchants on the other three alloys. The acid-type etchants are contained in mild steel tanks with plastic liners. All other solutions are contained in unlined mild steel tanks.

The heat treat condition of the metals at the time of etching is not critical, although a very slight but unimportant difference in etching speed has been noticed (not enough to affect tolerance). The chemical milling process induces no stresses in the metal, and any warpage of



Illustration showing typical aircraft and missile parts produced by chemical milling.

September, 1956 : modern machine shop 111

"With the chemical milling process, etched surfaces between 30 and 80 microns in smoothness may be obtained."

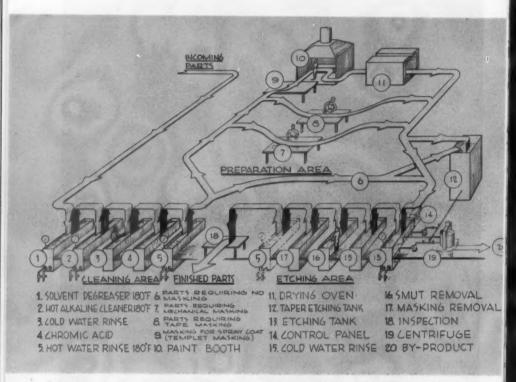


Diagram showing typical layout for chemical milling installation. Modifications of this particular installation to allow for the handling of specific types of work would be practical.

the part or sheet during chemical milling is caused by residual stresses that already existed within the material. Etched surfaces between 30 and 80 microns in smoothness may be obtained. Small surface irregularities are characterized by a gentle hill-and-valley shape. The sharp V-notches produced by a mechanical cutting tool are entirely avoided,

thus eliminating the danger of stress concentration points caused by this factor.

The etchants now being used for aluminum are operated at 180 degrees F.; the other etchants are used at mildly elevated temperatures, usually around 130 degrees F. Close temperature control will produce more consistent etching speed.

Solution strength is determined by ordinary titration techniques, and additions are made as required. A centrifuge through which the etching solution circulates continuously is used to remove all solids.

The two chemical milling lines now in operation at Turco Products, Inc., will be used for the purpose of training employees of companies which decide to adopt the chemical milling process.

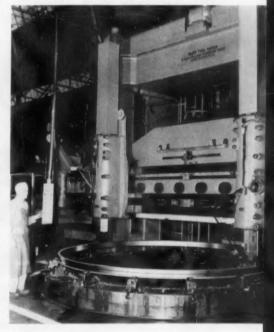
In brief summary it may be stated that chemical milling opens entirely new horizons, both to the design engineer and the machine shop operator. It permits copious use of materials difficult to machine by conventional methods. It permits the use of contours and cutaway sections which, it is claimed, are not practical to produce by any conventional machine shop technique.

It's a lively addition to the machine shop production family, so to speak . . . a new baby whose character and achievements will be largely molded by the ideas and imagination of those who foster its maturity.

\*\*\*\*\*\*

# Huge Boring and Turning Mill for Steel Rings

The 14-foot Niles heavy boring and turning mill illustrated herewith has been installed in the machine shop at the Standard Steel Works Division of Baldwin-Lima-Hamilton Corporation, Burnham. Pa. Shown here working on a 12foot roll-forged steel ring, the machine tool makes it possible for Standard Steel to finish-machine rings 2 feet larger in diameter than could be handled previously. The boring mill has a maximum swing of 14 feet 2 inches; a maximum height under the tool holders of 7 feet and under the crossrail of 8 feet 1¾ inches. Overall height is 18 feet 8 inches. The 14 foot table revolves at 3.76 to 22.1 revolutions per minute in high gear and at 0.50 to 3.76 revolutions per minute in low gear. For more data circle 1 on Reader Service Card



Heavy boring and turning mill used at Standard Steel Works to finish-machine steel rings.

# How Burroughs Saved

Work Simplification began at Burroughs in January 1953. Over the past three and one-half years it has proven to be an important part of the organization.

BY N. O. BAYLIS

Supervisor of Organization Services, Burroughs Corporation

Like so many other Work Simplification programs in the United States, a large part of the success at Burroughs can be attributed to Allan H. Mogensen, management consultant and director of Work Simplification conferences, Lake Placid, New York, and Sea Island, Georgia. Burroughs decision to undertake a Work Simplification program was based in part upon a two day management appreciation meeting conducted in Detroit by Mogensen. The individuals selected to administer



Work Simplification training room at the Detroit plant of Burroughs Corporation.

# Million Dollars

the program were later trained by Mogensen and his staff at Lake Placid and Sea Island.

## Structure

A unique feature about the Burroughs Work Simplification program is that it operates within a decentralized structure. Organization Services, a staff comprised of five people, functions as a central point of administration. A primary responsibility of this staff is to extend the program to all operating units of the corporation. At present, nine units have an active Work Simplification program in effect. These nine units. however, represent approximately 50 per cent of the total organizational strength. If the unit head is interested in the program, Organization Services will spend the necessary time to explain fully how the program might benefit his unit, and what it will take in terms of money and management support to make it work. Having decided to install the program, the unit head selects a man to administer the program in that unit. This man is called a Work Simplification coordinator and is sent to Organization Services to undergo an extensive seven week administration course. The coordinator then returns to his unit and develops a program designed to meet unit needs.

# Results

Since the inception of the program, more than 3,600 Work Simpli-



Willoughby Smart—symbol of Work Simplification used at the Burroughs Corporation.

fication improvements have been submitted, of which 3,013 or 81 per cent have been installed. The net result has been a savings to the corporation of well over a million dollars. In terms of investment return, the figure is over 200 per cent. John S. Coleman, president of Burroughs, thinks of the Work Simplification program as an aid to the discharge of responsibility of all members of management, constant improvement of operating methods and maintenance of high employee morale. It is the latter with which the Burroughs Work Simplification program is most concerned.

# Philosophy

A deep rooted interest in human relations and an attempt to understand first what makes people tick were responsible for the present Work Simplification approach at

# "... the first step involves a change of attitude toward improving methods of doing necessary work."

Burroughs. Studies in this area have indicated that people are generally satisfied to maintain things as they presently are. Therefore, the first step involves a change of attitude toward improving methods of doing necessary work. This is done by eliminating or minimizing certain barriers that normally stop people from making improvements; namely, I don't like the boss, I don't know how to improve, I might lose my job, and various other barriers. Equally

important is effective motivation.

The second step is to get people to consult with others. Finally, an attempt is made to develop a systematic approach to problem solving through the use of organized common sense. This is done through training.

# Training

Since each unit coordinator develops a Work Simplification training program designed specifically for

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Illustration of Work Simplification proposal form as used at Burroughs Corporation.



Willoughby Smart Work Simplification tolder and six booklets used at the Burroughs Corporation in its W/S program. The first five booklets cover every step of the five step plan in detail. The sixth booklet is devoted to a discussion of motion economy principles.

his unit, the type of training and in some cases, the material content of the training course differs. Training programs run from a series of nine two-hour sessions for manufacturing supervision to four one and a half-hour sessions for clerical people. In all cases, an attempt is made to emphasize the five step Work Simplification plan and more important, how this plan applies to everyday work situations.

- 1. Pick a job to improve
  - . . . while Consulting
- 2. Detail what is being done . . . while Consulting

- 3. Challenge each detail
- 4. Develop a better method
  - . . . while Consulting
- 5. Install the new method
  - . . . while Consulting

Great stress is laid on the consulting aspect of the plan. This is referred to as the human relations phase and it encourages that at each step of the plan people should be consulted. By consulting people early, getting their ideas and getting them into the act, one is more apt to come up with a better improvement.

On the technical side of training,

"... recognition is the principle method of motivating people to participate in Work Simplification . .."

flow process charts, flow diagrams, right and left hand charts and multiple activity charts are used. Emphasis is not placed on the charts themselves, however, but on the manner in which they help to organize thinking. More than anything else, it is important to get all the facts on how the job is being done before trying to improve it. This cuts down the possibility of a partial solution or what Burroughs people refer to as "flash improving."

To realize the practical benefit of these charts, each trainee is required to bring in from one to three learn-by-doing projects during the training period. Projects are discussed at length, in the training meeting and during individual follow-ups, suggesting methods of improving the charting process as required. When the problem has been solved, formal recording of the improvement is made on the proposal form.

# **Proposal Procedure**

Proposal forms are prepared in duplicate with space provided for the title of the job, how it was performed before, how it is done now, and why the originator thinks it will be an improvement. Space is also provided for a recording of tangible savings which is determined jointly by the originator and the Work Simplification coordinator. There is no formal follow-up system for tangible savings at Burroughs. Savings are estimated on a "first year" basis. The last available space

on the proposal form is for the originator's signature, the signature of all those consulted on the project, and all other necessary approvals. One copy of the proposal form is kept by the Work Simplification coordinator and the other is filed in the originator's personnel folder. This is one method of recognizing the individual's contribution.

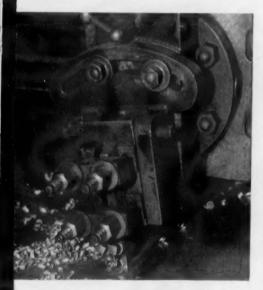
# Recognition

At Burroughs, recognition is the principle method of motivating



The old method of planing steel plates was to use a large tool bit for the first or roughing cut. A smaller tool bit would then be used for the finishing cut. This method created a great deal of heat in the roughing cut, causing the plate to occasionally warp.

people to participate in Work Simplification and it follows numerous patterns, none of which involves direct monetary reward. Of prime importance is the recognition given to an individual by his immediate supervisor. This is the person who determines his level of promotion. Recognition is constantly stressed at Burroughs since, among other things, the program is designed to solidify the relationship between supervisor and subordinate. It is also emphasized that recognition need not be of a formal nature as long as it is sincere and given when an individual merits it. Informality at this level. however, does not mean that a for-



Two tool bits are now used at the same time to plane steel plates—one tool being used to rough cut and the second tool to finish cut. This method has cut down on the warping and also eliminates the extra time used to change tools and take a second cut.

mal structure of recognition is non-existent.

Upon installation of three improvements, individuals are presented with a certificate of merit and a Work Simplification lapel pin, The company newspaper, The "B" Line, is also used to publicize outstanding projects or unusual occurrences in the program such as the installation of the program in a new unit, Letters of commendation from the plant manager, unit head and Work Simplification coordinator are also an important part of the formal recognition program. In addition, unit newsletters such as "Workin-Work Simplification" publicize the Work Simplification activities of a particular unit. In one Work Simplification unit, a series of bulletin boards are placed strategically throughout the plant. These boards are used to publicize outstanding projects and to illustrate a specific principle of Work Simplification such as prepositioned tools or motion economy.

## Promotion

To maintain interest in the program, trainees are called back approximately every six months for a refresher program. The purpose of the refresher is to introduce a new Work Simplification tool, Therefore, only a small amount of time is spent redefining the principles and philosophies of Work Simplification. Thus far, two new tools have been introduced - creative thinking and conference leadership-both applicable to group problem solving situations. Willoughby Smart blotters with appropriate slogans are also used to promote the use of Work

# "... Work Simplification is helping to build future managers..."

Simplification. Willoughby Smart is the visual symbol of the program in Burroughs.

At the outset, top management realized that the eventual success of the Work Simplification program would be directly related to the support and interest it received from all members of management. Active and visible support has therefore become an integral part of the program. In almost all cases, the unit head opens or closes each training session. It is also common practice for the unit head to present the Work Simplification certificate and pin. In one unit, the Work Simplification coordinator selects the top three projects submitted for the month and the unit head makes a personal trip into the shop to view each project and offer his personal thanks and congratulations. It is management's philosophy that through Work Simplification, Burroughs is helping to train and build future managers of the business

# **Management Development**

The subject of management development is more than a management philosophy. Over the past three and a half years it has proven to be a reality both within and without the structure. Many people throughout the organization have been given extra consideration in promotions because of their ability to think about and improve their work habits. Work Simplification coordinators have



OLD WAY: Checking part that requires 74 drilled holes. Holes must be checked to see that they are in the proper position and also that all 74 holes have been drilled in part.



NEW WAY: A plastic overlay has been made with all seventy-four holes in their proper position. Overlay is used by both operator and quality control man to check part.

also benefited through Work Simplification experience. Some typical examples are Work Simplification coordinators who have become supervisor of methods and time standards engineering, superintendent of a manufacturing division, personnel director, administrative assistant to the sales manager and training director, to name just a few. The first two administrators of the corporate program have become the assistant treasurer of the corporation and defense contracts sales manager.

# Non-Supervisors and Work Simplification

Although Work Simplification training has been almost entirely restricted to supervisory people, there is little doubt that it will be extended to people below that level in the future. In one unit, the entire staff of sixty-eight people has been trained. Of the one hundred seventy projects submitted by this group and installed thus far (which is an average of almost three projects per person), 77 per cent have been submitted by non-supervisory personnel. The decision to train at lower levels is up to the unit head and his coordinator.

Work Simplification at Burroughs is a long range and permanent program. The results of the program for the first three and a half years have been highly acceptable.

\* \* \*

Ball Bearing Maintenance. By Johnny Riddle. Published by The University of Oklahoma Press, Publishing Division of the University, Norman, Okla. 170 pages. Illustrated. Cloth binding, board covers. Price, \$6.00.

This book is devoted entirely to the principles of maintenance which are known to contribute to good bearing performance and a balanced service life. In the simplest terms, it tells how the consumer can begin at once to enjoy better ball bearing performance. In 10 tersely written chapters, the author includes an explanation of the basic bearing types and their variations, in addition to design changes which may affect suitability for a particular mounting: a thorough study of unit failures, with photographs taken as the bearings actually failed and a technical analysis of the failure and its cause; requisites of shop operations and the proper methods of handling, mounting and disassembly; shaft and housing modifications or replacement: the importance of a shaft seat and the variations in basic housing designs; and the principles of lubrication, with a discussion of oil and grease properties, chemical and physical characteristics of lubricants, and the impairment of machine facilities by the use of poor quality lubricants or by the improper use of good quality lubricants.

# More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 404.



Tapping brass fire extinguisher elbows with an automated drill press. The drill feed is foot-controlled, and both of the operator's hands are free for placement of the work.

# **Drill Feeds Speed Production**

At General Pacific Corporation, automated drill presses play an important role in high speed production of fire extinguishing equipment.

By GILBERT C. CLOSE

The industrial engineer is faced with a constant and neverending problem that is minus any ultimate and final solution—how to increase production and reduce costs. Nevertheless, the degree in which he solves this problem, finding a partial solution here, another there, is usually a good barometer of his own and also his company's success.

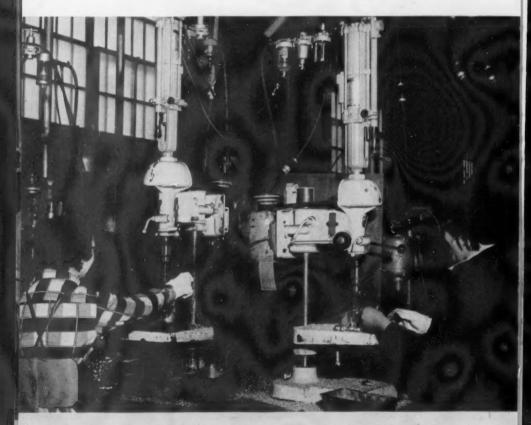
The same problem, with fewer ramifications, is faced by each department head within the company organization. Among these department heads, the machine shop superintendent is unusually fortunate, for in the past few years numerous methods of increasing machine productivity and reducing personnel requirements have been literally "dropped in his lap." Multiple machine fixturing, progressive punch press dies, and opportunities for localized automation are just a few to mention.

In this scramble to improve machine efficiency, the lowly, hand-operated type of drill press has not escaped attention. Good evidence of this is forthcoming at General Pacific Corporation, Los Angeles, California, one of the nation's largest manufacturers of fire extinguishing equipment. At General Pacific, automated drill presses play an important role in production work. Greater production speed and minimized personnel requirements are the direct results of their use.

The drill presses are automated by a company designed and manufactured device which attaches to the drill press directly above the spindle (see accompanying illustrations). These automatic drill feeds can be preset for pneumatic control of the drill spindle during its rapid approach to the work, and then hydraulic control of the spindle at a slower preset speed as the drill feeds into the work. When the required and preset drilling depth has been reached, the feed automatically retracts and the drill spindle spring lifts the drill out of the hole. In deep

# "As the feed is not attached to the drill spindle . . . drill press can be hand operated . . ."

drilling work, the feed can be preset to feed the drill a certain distance into the work, let it retract for chip clearance, and then return to within 1/32 of an inch of the last drilling depth and take another bite. This repetitive action can be preset to continue on holes up to 4 inches deep. As the drill feed is not attached to the drill spindle (it merely butts against it in the downward stroke), the drill press can be hand-operated in the usual manner when desired. With the drill feed in use, a



Side-by-side elbow drilling (left) and cleanup operations are performed using conventional drill presses on which automatic drill

feeds have been installed. This automation setup has stepped up production nearly 300 per cent over old hand drilling operation.

# "The automatic drill feed never becomes tired or careless . . . continues to turn out parts . . ."

foot pedal is employed for its operation, leaving the operator's hands free for jig tumbling or otherwise

placing the work.

Incorporation of this device on the drill presses in General Pacific Corporation's production line resulted in production speed increases ranging upward to 300 per cent. In one case, it was necessary to drill. thread, and clean up a small brass elbow used in a hand-type fire extinguisher assembly. Prior to installing the automatic drill feeds. three skilled drill press operators manned three different drills to accomplish this work. Today, with an automatic feed on each of the three drills, a single unskilled operator can turn out the same amount of work

"There is also less drill breakage and fewer rejects than before," a General Pacific engineer pointed out. "The automatic drill feed never becomes tired or careless, and when properly adjusted by an experienced set-up man, continues to turn out parts drilled to the necessary degree of precision."

Plans are afoot to increase even further the production rate on this particular operation. Two drill presses, each incorporating an automatic feed, will be installed at an angle so that both holes in the brass elbow can be bored in a single operation. The drill feeds will be synchronized so that one drill reaches the bottom of the hole and retracts before the second drill intersects to complete the elbow bore.

In another operation, a drill press



The automatic drill feed does not hinder the use of the drill for hand operation. The drill spindle is not attached to the drill feed.

"... the automatic drill feeds are used extensively in their own manufacture."

equipped with an automatic feed and an air vise is used to tap threads on one end of a fire extinguisher discharge tube. With the automatic feed properly preset, the tap approaches the tube rapidly, taps the necessary thread length, and then retracts. But the air vise holding the tube in position retains its grip until the operator has screwed on the extinguisher discharge nozzle. When the operator releases the foot control lever, the air vise releases the tube. Thus, both a production and an assembly operation is accomplished in less time than it formerly took to merely tap the threads with a hand-operated drill press.

A unique situation here is that the automatic drill feeds are used extensively in their own manufacture. The success of the feed on their own production lines lead General Pacific Corporation into producing a commercial version of the device. The combined pneumatic and hydraulic functions of the feed demand numerous holes, ports, and orifices to serve as or to attach to compressed air and hydraulic lines. These holes and orifices in the drill feed components are produced on drill presses equipped with some version of the finished product.

In one operation, an air-indexed rotary table jig is synchronized with the automatic feed so that all parts mounted in the jig are drilled in a single repetitive operation. Another automated setup is used to deepdrill a  $3\frac{1}{2}$ -inch hole with a plus-orminus 0.002-inch tolerance. Several of the operations require jig tumbling, and here the automatic feed speeds production by leaving the

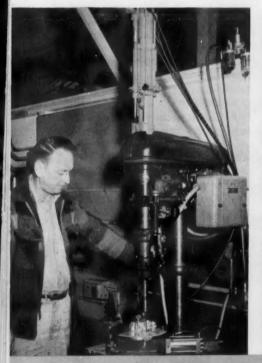


Fire extinguisher discharge tube clamped in air vise has just been tapped by automated drill press, Now, before releasing vise, operator is screwing on discharge nozzle.

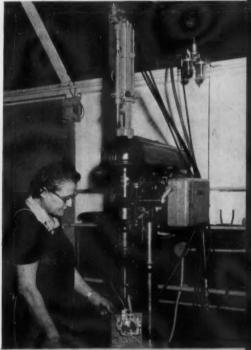
# "... automated horizontal drill spindle is mounted in a lathe for precision deep hole drilling."

operator's hands free for jig tumbling and placement. In another setup, an automated horizontal drill spindle is mounted in a lathe for precision deep drilling work.

"While we are one of the major fire extinguisher manufacturers in the country, we're still in a highly competitive line of business, and production cost cutting without sacrificing quality is an important phase of our business operations," C. D. LeBlanc, General Pacific's treasurer, points out. "Our automated drill presses have served very well in this line of endeavor, and we'll continue to work them into our production lines wherever we can, both for greater speed and minimized personnel requirements."



Automated drill machines orifice in top plate of automatic drill feed, which is mounted on air-indexed rotary table so that several operations may be done in single setup.



Deep-hole drilling a hydraulic fluid channel in an automatic drill feed component. The drill is automatically retracted at preset intervals in order to provide for chip clearance.

# Bench-Vise Fixture for Holding V-Head Screws

Design permits threading of screws practically up to the head.

By W. M. HALLIDAY

The accompanying sketch shows a simple bench-vise fixture which was primarily designed to firmly hold a number of screws of the type shown at X so that the threads could be extended farther up the shank, almost to the base of the head. The fixture comprises a long cylindrical steel sleeve, A, whose bore is threaded to screw easily on the standard type hexagon head screw B. The diameter of the shank of this latter member is appreciably larger than the maximum diameter of the head screw X to be threaded. A shallow concentric recess, C, is machined into the squared-up end of the shank of screw B. The diameter of such recess is made slightly larger than the maximum head diameter of the component X so that the latter may slip easily therein. The depth of the recess is about 1/8 inch, or less, according to the size of screw head to be gripped.

A thin hardened and tempered cast-steel driving key, D, is press-fitted into a corresponding size slot machined diametrically across the recessed end of screw shank B, to a depth of about  $\frac{3}{4}$  inch below the bottom of the recess. The thickness

modern machine shop

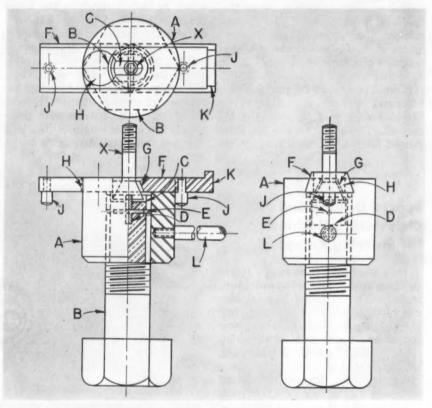
of the key is slightly less than the width of the usual screw driver slit across the top of the screw head X. The key projects a suitable distance into the recess C so as to mesh into the screw driver slot when screw X is positioned in the recess in the manner indicated. The key is retained by means of a pin, E, located crosswise through the screw shank.

A shallow dovetail guideway is milled across the upper endface of sleeve A to lie exactly central with the bore of the latter. The depth of this guideway is slightly less than the height of the head on workpiece X. Sliding smoothly in this guideway is the case-hardened steel slide F, whose length is about twice the outside diameter of sleeve A. Machined centrally in the width of this slide is an elongated slot, G. The sides of such slot are tapered in the direction shown to match the taper on the sides of screw head X. The minimum width of the slot is about 1/32 inch greater than the diameter of the shank of screw X. At its left-hand end the elongated slot terminates in a large round hole, H, bored completely through the slide. The diameter of this hole is approximately  $\frac{1}{8}$  inch larger than the maximum diameter of the screw head, so that the latter may easily fit through such hole. The slot G is located exactly central with hole H.

Slide F has a certain limited amount of crosswise movement through sleeve A. When the slide is drawn fully to the right, hole H lies exactly in vertical alignment with the bore of sleeve A and concentric with recess C. When the slide is moved fully to the left, as shown in

the sketch, the elongated slot *G* lies substantially over the bore of the sleeve. The two stopping positions of the slide are determined by means of small pins, *J*, screwed into the underside of the slide, one near each end. The stops also prevent the slide from being accidentally pulled completely out of the sleeve guideway.

A raised integral stop *K* is provided on the top right-hand end of slide *F* to afford a convenient finger grip when operating the slide to and fro.



Sketch of simple bench-vise fixture for holding V-head screws while extending threads.

"... the screw is held firmly against rotation and extends absolutely vertically out of the fixture . . ."

A short steel rod, *L*, is also screwed into one side of sleeve *A* at a convenient location to facilitate turning the sleeve when clamping and releasing components *X*.

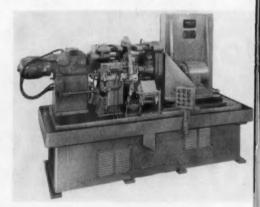
To use the fixture, screw B is gripped by the head in the jaws of a bench vise, in an upright position, and remains in this position throughout all operations performed on the batch of workpieces X. To mount one of the latter in the fixture, sleeve A is unscrewed about three-quarters of a turn on screw B. Slide F is then drawn to the right up to the limit permitted by pin J at the left-hand end of the slide. This brings hole H exactly over the recess C. The workpiece X is then passed head foremost through such

hole to drop into the recess C: the workpiece, at the same time, is slightly turned so that key D engages the screw driver slot. When this occurs slide F is moved leftward until restricted by the second stop pin J, whereupon slot G has passed over the shank of the screw to fit against the tapered sides of the screw head, as shown in the lower diagram, Sleeve A is finally threaded slightly farther down screw B, which action results in the screw head X being gripped between slide F and the bottom of recess C. Thus, the screw is firmly held against rotation and extends absolutely vertically out of the fixture, with practically the entire length of its shank exposed and easily accessible.

\* \* \* \* \* \* \* \* \* \* \* \* \*

# Special Drilling and Chamfering Machine for Steering Knuckles

This vertical, indexing - type, drilling and chamfering machine, built by The Hartford Special Machinery Co., Hartford, Conn., employs one cam feed unit and one barrel cam feed unit. With quadruple loading, automatic clamping, unclamping and ejection, the machine drills the pin hole of steering knuckles at the rate of 1,600 parts per hour at 100 per cent efficiency. For more data circle 2 on Reader Service Card



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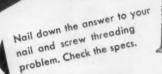
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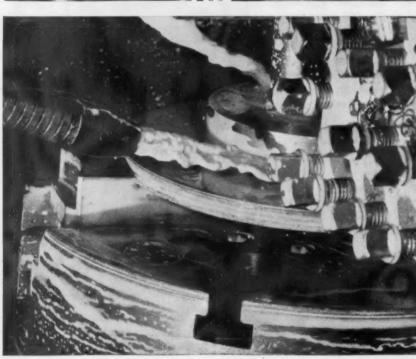
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# THE QUEST ONE BEST WAY

The author concludes his discussion of the many factors which influence the cost of a product and which frequently are beyond an operator's control.

By W. A. NORDHOFF

Machine-tool design is not a static thing. Design engineers are constantly modifying machines to increase their productivity. New machine tools are often built which obsolete conventional methods and machines for producing special configurations. This means that if one wishes to produce to capacity, he must keep up with and employ this new equipment.

If a machine operator can only meet a fraction of the rated capacity of a cutting tool because of the horsepower limitations of a machine, it appears then that effective production can only be achieved by switching the job to a machine having ample horsepower. Operations cannot be performed most economically on machines having insufficient horsepower.

Template-controlled tracers facilitate the machining of contoured surfaces such as the many-diametered profile of a shaft or the compounded curves and angles of a milled plate. Higher spindle speeds are being incorporated into machine tools. Older and obsolete equipment should be replaced by these more effective machines. The new aluminum oxide, ceramic cutting tools will force machine-tool designs to go to even much higher spindle speeds and greater horsepower.

Specialized machines are designed to do certain jobs more accurately and in less time. When production requirements warrant, odd shaped holes, internal splines and serrations can be done much faster on a broach than on the conventional mill or the shaper.

There are other specialized machines which cold-form shapes, serrations, splines, and some gear forms. Extremely high production is obtained on thread rolling machines which employ the cold-forming process.

The turret drill press will most likely drill a series of holes more economically than the conventional gang (progressive) drill press or the conventional single-spindle drill press employing quick-change drill chucks.

Grinding machines also improve. It is possible to straddle grind on a disc grinder. Centerless grinders automatically grind concentric diameters. Several diameters can be ground simultaneously by external grinding machines.

Among the many improvements in machine tools there is one which makes possible the presetting of spindle speeds and feeds during the setup operation. The time-consuming occupation of manipulating feed and speed levers several times during the fabrication of a part is now eliminated in some machines by merely indexing a selector. Some machine designs now employ punched tapes to monitor its work.

Automation, of course, has introduced the last word in machine-production processes. Such a program is usually predicated on a series of machine tools which have been engineered into an integrated production unit. This combine is said to reduce fabrication time from hours to minutes.

# **Cutting Tools**

The history of cutting tools has been one of constant improvement in their quality. Cutting speeds at which the tools can withstand have increased tremendously.

Some thirty-five years ago the cutting-tool field was dominated by high speed steel. Then, carbides began to challenge the accepted machining practices of the day. A similar challenge is now being offered present-day cutting practices by the new aluminum oxide, ceramic cutting materials.

We can conclude then that the production of machined parts has been greatly increased by the improvement of cutting tools. It would appear that the following questions should be asked of any job employing cutting tools:

 Would a better quality cutting tool increase production? From high speed steel to carbide.

2. Are the cutting edges for tools operating in aluminum sharp, polished, and free of wire burrs?

3. Is ample chip clearance provided in milling cutters working in aluminum and magnesium?

4. Would broaching increase the production of bored, close-tolerance holes? of odd-shaped holes?

5. Would a cutoff job lend itself to greater production if done on an abrasive cutoff machine rather than on a band saw or a power hack saw?



"Operations cannot be performed economically on machines having insufficient power."

"To prevent loss of production when changing from dull to sharp tools, duplicate tools should be available."

6. Have stepdrills been considered for multi-diametered holes?

7. Can production be increased

by using a form tool?

8. Are tools operated beyond their normal "tool life"? It is usually false economy to make a tool "last all day."

 Does the job lend itself to the ganging of tools? Multiple-spindle drill operations, straddle-mill operations are examples of the ganging of tools.

10. Can the thread-rolling technique be employed to produce the

thread forms?

11. Is there an ample reservoir of cutting tools? This is necessary where special tools, matched cutters, and form tools are employed. To prevent undue loss of production when changing from dull to sharp



"Are tools operated beyond normal life? It is false economy to make tool last all day."

tools, duplicate tools should be immediately available.

12. Are maximum speeds and feeds employed on roughing cuts without concern over the rms finish obtained? Reaming, broaching, grinding, fine feeds are for the purpose of meeting surface finishes as well as dimensional requirements.

# **Production Tools**

Jigs and fixtures are production aids designed to facilitate the production of parts. They perform the function of a holding device. They may also combine this function of holding with that of a template to insure the duplication of parts without layout.

 Would a production aid—jig, fixture—increase production on the

job under observation?

2. Is the production tool equipped with cam-action clamps? air-actuated clamps?

3. Does the production tool have

automatic ejectors?

- 4. Would duplicate tooling speed production? This would make possible the loading and unloading of parts in one fixture while other parts are being machined in the duplicate fixture.
- 5. Is the tool foolproof? A foolproof fixture would prevent the wrong machining of parts due to an incorrect loading of the production tool.
- 6. Has ample space been provided in the tool for the escape of chips? This is particularly necessary in drill

# MON

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"The fabrication of parts from solid bar stock is one of the most time-consuming methods of production . . ."

jigs. Otherwise chips jamb between the work and the jig body requiring removal manually by the operator.

## **Materials**

Materials have various physical properties. This gives one material going into a part preference over another. The material selected for a part is chosen because of its physical properties and is considered essential if the part is to satisfy its function.

Materials also possess varying degrees of machinability. This means some materials are more machinable than others. With this in mind—and all other considerations being equal—it stands to reason machined parts should be made of the most machinable material allowable.

Low carbon steel is more machinable than high heat-treated alloys; brass is more machinable than carbon steel; magnesium is more machinable than brass. When a detailed methods analysis is made of the processing of a part, it might pay to ask the question: Could the part be made of a more machinable material and yet leave its function and its quality unimpaired?

It is easier to work metals in the annealed state. Surfaces which are not important to the function of the part should be finish machined before heat treating.

# **Material Shapes and Forms**

The fabrication of parts from solid bar stock is usually one of the

most time-consuming methods of producing parts. There are many short cuts to a finished product—if one starts with materials already partially formed, Some of these material forms are:

 Tubing. Saves extensive drilling and boring. Production output is high.

2. Extrusions. These come in an infinite variety of standard shapes. Milling operations are eliminated. Production output is high with scrap loss low.

3. Sand castings. Attaching surfaces, close-tolerance dimensions only need to be machined. Holes must be drilled and bored.

 Forgings. The number of surfaces that need to be machined are reduced, No-draft or zero-draft forgings reduce machining still further.



"Would a production aid—jig, fixture—increase production on job under observation?"

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# "The cost of a part is greatly influenced by its design."



"Nothing essential is accomplished in designing a part which is a fancy work of art . . ."

.5. Permanent Mold Castings. Only close-tolerance dimensions must be machined. Holes must be drilled.

6. Die Castings, Minimum machining required.

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If it is expedient and advisable to fabricate parts from bar stock, it is more economical to choose the cross section which will permit the greatest number of full-length, parallel cuts in the stock. This permits a series of cuts to be completed on several parts with one, instead of several, handlings per cut. When the maximum number of cuts have been made, then the individual parts can be readily sawed off from the original

piece of bar much like slices of bologna.

# **Design Consideration**

The cost of a part is greatly influenced by its design. Each limiting factor of design increases fabrication costs. Each little symbol, each dimension, each little drafting curlicue added to the blueprint increases the cost of the part.

Designs of parts are usually not frozen and many cost-saving suggestions could be incorporated without requiring any modification of the assembly into which the parts go. We should ask the following questions about a part to enable us to determine whether a redesign of the part would reduce the cost of making it:

1. Are the materials of maximum machinability used?

2. Have standard sizes and shapes of bars, tubes, and extrusions been called for?

3. Have standard threads been called for? Nonstandard thread forms require special tools and special gauges. Nonstandard threads should be avoided.

4. Have nonstandard hole diameters been indicated? Any nonstandard form requires special tools and gauges for their fabrication and inspection.

Has the design been made as simple as possible? Simple designs are economical designs.

6. Have blind holes been so dimensioned that they will allow am-



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"Threading to a shoulder is more difficult than threading to a relief."

ple chip clearance in the event that tapping or grinding operations are necessary?

7. Does the designer call for threads to a shoulder? Threading to a shoulder is more difficult than threading to a relief. Imperfect threads should be allowed or a thread relief indicated.

8. Does the blueprint call for square-bottom holes? A square-bottom hole usually requires an added operation.

9. Does the blueprint call for fancy finishes that add nothing to the quality or the function of the part?

10. Are the concentricity qualifications essential?

11. Have the most liberal tolerances been allowed? Fractional tolerances are least expensive to meet:



"Many ideas come from the journals of the trade. All are full of time-saving ideas."

close tolerances are most expensive. Stock dimensions are "free."

12. Does the blueprint call for sharp corners? Are they necessary? Sharp corners are difficult to machine and they are easily damaged in handling.

13. Are close-tolerance relationships indicated on the blueprint which actually do not exist in the functional operation of the part? Often hole patterns are dimensioned to one another when the relation is of no real importance. Cotter pin holes usually have no bearing upon the rotation of the part.

14. Does the blueprint call for dimensioned chamfers when the part only needs machined edges broken?

There are other design considerations, but these indicate stumbling blocks to maximum economy of production caused by shortsighted design engineers. Fundamentally the cost of a part is determined by the designer. His objective should be to reduce dimensional requirements to a minimum. Nothing essential is accomplished in designing a part which is a fancy work of art only to hide it in some far reaches of an assembly. Any not-so-fancy a part which would function as well is good enough to hide in an assembly. Also it costs much less.

### Planning

Another group of persons who influence the cost of a product are planners—the people who plan the fabrication processes.



For more data circle 301 on Reader Service Card

### "Jobs should be planned to minimize handling."

Fabrication processes, skillfully planned, are economically planned. It is more economical to plan a job once by a skilled planner and to acquaint the shop of the method by operation sheets than it is to have

the job replanned by machine operators each time it hits the shop.

Operation sheets should carry a description of the operation for each step in the sequence of operations, a list of the cutting tools and production tools required to perform the operation, the feeds and spindle speeds at which machines should operate. Production goals should

also be incorporated in the planning paper as an indirect incentive for the operator to turn in a fair day's work. Operators usually make every effort to meet a reasonable production goal when they know what it is. Also. indicating the labor grade required to adequately perform a task (operation) is a help to supervision to assign a job to an operator with the proper skill.

Jobs should be planned so that a minimum of handling will be required. A part is most economically produced when the greatest number of operations are performed at one

# FLOATING LAMPS

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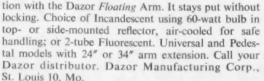
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"Planner is in position to catch engineering errors."

work station before being transported to the next station. It is much easier to hold concentric diameters on a part machined from bar stock on a lathe if all of the diameters are machined before the part is cut off.

It is difficult and requires much extra time to meet concentricities on second operations.

It is less expensive to have a low labor grade clerk deliver material, cutting tools, production aids, job instruction sheets, and so on, to an operator at a machine than it is to have a machine operator get these things for himself from various cribs.

The machine operator is of more value to his company by keeping an expensive machine producing.

The planner bridges the gap between the shop and the engineering department. He is in a strategic position to catch engineering errors before the work hits the shop. His knowledge of shop processes and equipment enable him to make suggestions to design engineers which may result in a more economically produced part.

The function of the planner is to plan work to be done on the proper machine tool with the right produc-



"MEYCO"

CARBIDE

KNOW-HOW!

# PRECISION CIRCULAR CUTTERS!

MEYCO carbide tipped and solid carbide cutters have earned an enviable reputation in plants where long tool life and precision workmanship is a MUST.

These cutters can be furnished in various diameters and thicknesses to meet the requirements of individual

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Saws and cutters, both carbide tipped and solid carbide, will aid production and precision in your slotting, venting, slitting and grooving operations . . . and they will be manufactured to your specifications. Please furnish complete specs and quantities desired when requesting prices and indicate material to be cut. Meyco experience in the manufacture of precision tools, since 1888, is at your disposal. Write for Bulletin No. 53.

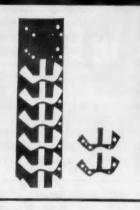


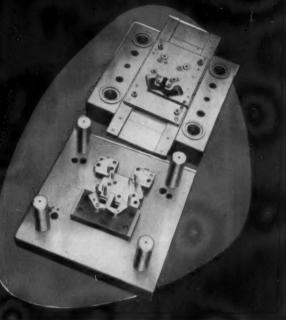
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W. F. MEYERS CO., INC., BEDFORD, INDIANA

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# Carbide Economy!





4700 MAGNETO LAMINATIONS PER HOUR!
PRODUCED BY GALE PRODUCTS, DIVISION
OF OUTBOARD, MARINE & MFG. CO., GALESBURG, ILL., WITH A HARIG CARBIDE DIE.

Producing laminations for outboard motors and rotary power mowers, this Harig carbide die produces an average of  $2\frac{1}{2}$  to 3 million parts before reconditioning is necessary. Parts must be burr free to assure alignment of stack, and tolerances held from .002 to .006 maximum. Stamping material is Silicon core plated c-2 #26 ga. .0200—.0170 steel.

This is a typical example of Harig engineering and manufacturing skill. Pioneers in the use of carbides, Harig sets industry standards for precision and quality.

Let us estimate your next special tool or die job. There is no obligation.

# Headquarters for the Finest in Precision Tools!

Harig engineering skill is at your disposal whenever you need special ' precision tools and dies. We will be '



glad to send you this fully illustrated catalog showing our services and facilities.



### "Many helpful ideas come from trade journals."

tion tool and with the correct cutting tool. An astute planner would not suggest a tack hammer to drive a spike.

### **Shop Suggestions**

The adage—two heads are better than one-is taken seriously by industry as attested by the many active suggestion departments it has in operation throughout the country. Thousands of dollars in awards is paid monthly by management to employees in industry for cost-reducing ideas. Every shop man has ideas of how to increase the productivity of his job. It usually takes the shopsuggestion system to smoke out these ideas.

#### Miscellaneous

Getting things done the best and most economical way is the concern of all. Any idea gleaned from any source that contributes to this end is good.

Many helpful ideas come from the journals of the trade. All are full of time-saving ideas. The advertisements of the machine-tool industry, the cutting tool manufacturers, the foundries and metal mills have one theme in common—their products will produce it in less time. These advertisements are fruitful sources of cost-reduction ideas.

One generally accepted principle of scientific management is the one which holds that production can be



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NEW MEDELTON AUTOMATIC COIL CRADLE

SAVES LABOR! SAVES MONEY! DESIGNED FOR GREATER EFFICIENCY AND SAFETY IN HANDLING COIL STOCK

- · Roll on your coll and it's ready to go.
- Screw operated separator plate.
- · No lifting, no pull, no accidents.
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- · Can now be equipped with Pinch Roll attachment.

Phone or write for new folder . Dealer inquiries invited.

WM. HALPERN & CO., Inc.

MACHINE TOOLS

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STROKE CONTROL means that you set the most practical length of stroke for each job—60 strokes per minute at 1½" stroke, 24 strokes per minute at 1½" stroke. The cam shaft does not make a full revolution as is true with flywheel driven press brakes.

Regardless of length of stroke used, the ram speed is always constant to insure

safe, smooth, efficient operation. No violent whipping action of material.

Twelve tons of smooth hydraulic power is applied through a mechanical cam drive which assures perfect, positive alignment of bed. Ram can be 'inched' or immediately backed-off. Capacity is 16 gauge steel across 36" bed. Wide variety of standard dies in stock.

For short run or experimental work use the Di-Acro hand operated Press Brake. Eight tons of power forms 16 gauge steel across the 24" bed. Uses standard dies.

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Send for our new brochure describing the 16 points of superiority of the VEET Precision Radial Drill.



For more data circle 308 on Reader Service Card

"... production can be increased by encouraging the worker."

increased by encouraging the worker to greater effort with proper incentives. Defining the task through motion study, establishing its value by time study are sound scientific steps toward getting the work done the one best way with the least effort and at the minimum of cost.

#### Conclusion

This shower of material things—at prices which we can afford—did not come to us by chance. It came because a great many people interested themselves in the most economical way to do a great many things. There are a thousand expensive ways to do a job incorrectly. Recognizing any one of these incorrect ways is the first step in the direction of doing it the right way. Doing the job the right way assures a continuation of our high standard of living and present material well-being.



"Clarence has come through with a great idea. He suggests we all knock off for coffee."

September, 1956

# NOW! THOR INCREASES POWER OF NEW AIR GRINDER

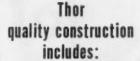
50%

THOR'S new 7½ pound vertical air grinder is more powerful, more versatile. Completely streamlined, one piece housing encloses everything but spindle and sanding disc or cup for easier, safer handling. Available at three basic speeds—4500, 6000, or 8000 r.p.m.

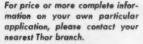
All models supplied with four position throttle for operator convenience.

Can accommodate sanding discs up to 9" diameter, depressed center wheels to 7", cup wheels and wire brushes to 6".

Extremely quiet exhaust.



Automatic mist oiling for all moving parts from a large capacity reservoir onew, adjustable type positive speed governor, long lasting oeasy disassembly for maintenance inspection ospindle is mounted on double row, pre-loaded ball bearings to take thrust of extra power hardened steel center plates olamped rotor to prevent wear on end plates overy low air consumption.





6" wire brush with stationary guard





9" sanding disc



Depressed center

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Branches in all principal cities

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### FOR MILLIONS OF GEARS

...Fellows



Fellows Heliguide Hobbing Machine cuts a 37-tooth gear in SAE 4027 carburizing steel on one spindle and a 27-tooth gear on the other. Production, each spindle: 35 gears per hour.

> Fellows No. 4GS Gear Shaper cuts twelve 32-tooth, 7 D.P., ½" face helical gears per hour or seven 15tooth, 6 D.P., 2-1/16" face spur gears per hour. Set-up shown is for 20-tooth helical on countershaft.



### A YEAR

### Speed and Accuracy!

Over nine million gears a year for truck transmissions and other major sub-contracting jobs are made by the famous New Process Gear Company, Syracuse, N. Y. Their records show that because of their speed and accuracy their new Fellows Gear Production machines have lowered cutting costs by more than half!

For example, the Fellows Heliquide two-spindle hobbing machine at New Process



cuts six times as many gears per hour as the previous machine. In addition, it saves approximately two hours in set-up time, requires only one operator to watch it because of its easy push-button operation. One man can operate four of these Fellows high-speed Heliguide Hobbing Machines.

New Process gets similar benefits from each of its ten Fellows No. 4GS Gear Shapers, Cutting 30% faster than the old machines, the No. 4GS Gear Shapers also hold to 25% closer tolerance without difficulty, saving on set-up time.

For full information about the complete Precision Line of Fellows Gear Production Equipment, get in touch with your Fellows representative. Write, wire or 'phone any Fellows Office.

THE FELLOWS GEAR SHAPER COMPANY 78 River Street, Springfield, Vermont Branch Offices: 319 Fisher Building, Detroit 2 150 West Pleasant Avenue, Maywood, N. J. 5835 West North Avenue, Chicago 39 6214 West Manchester Avenue, Los Angeles 45



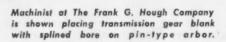
# Gear Blank Turning Facilitated

## Hough Company claims production increase of 10 to 15 per cent.

Precision machining of splined bore gear blanks with accuracy and speed is a difficult operation. Yet, The Frank G. Hough Co., Libertyville, Ill., has simplified the task of maintaining precision and has also increased production by 10 to 15 per cent while making the machinist's job easier through the use

of pin-type arbors made by Scully-Jones and Co., Chicago. These tools are designed with regularly spaced pins around the arbor body, and, when a piecepart is loaded on the arbor, the pins fit into the internal splined bore. As the piecepart is rotated, the pins move up ramp-type cams and are forced into line contact







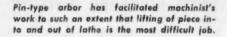
Gear blank is machined on Fay 20-inch automatic lathe, with square end of arbor driven by means of the spindle faceplate.

### by Use of Pin-Type Arbors

with adjacent splines near the pitch line. The part is then firmly locked to the arbor, since the pins apply equal forces all around the splined bore to eliminate play and improve accuracy. Thrust from turning or grinding operations keeps the piece from loosening.

Transmission gear blanks are turned, faced, and beveled at The Frank G. Hough Company with the aid of these pin-type arbors. Experience has indicated a production increase of 10 to 15 per cent with improved accuracy of the finished gear. A Fay 20-inch automatic lathe is used for the machining operations, and 0.250 inch of stock is removed on the o.d. at a feed of 0.010 inch and speed of 460 s.f.m. Carbide tools on the lathe front slide cut the o.d. and face the hub, while upside down mounted tools on the back slide plunge feed to face the gear flange.







A twist of the wrist releases the pins from the splined bore of the gear blank and permits easy removal of the finished workpiece.



set-up saves 30%

Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mig. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

They are facing 6" diameters; drilling for 1/2" bottom tap, and tapping with a 1/2" bottom tap on this job.

The part being processed is a Bronze Top Casting.

Cincinnati Super Service Radial Drills are profit makers in this shop, and they could be in yours.



Write for Bulletin R-21C

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There's a FIANDARD Dial Snap Gage
That Fits Your Particular Requirements... Precisely

STANDARD'S Paralloc anvil locking mechanism maintains parallelism of anvil faces to an unusually high degree of accuracy

### L TYPE ...

For tough, long run jobs or those involving deep, narrow places

Gages close to shoulders Flat anvils, faced with tungsten carbide, ideal for

tungsten carbide, ideal for close tolerances Indicator fully guarded,

conveniently placed for easy reading

Sizes up to 14" Wide range of indicators

### D TYPE ...

With Paralloc anvil locking mechanism and tungsten carbide faced flat anvils

Lower initial cost

Gages close to shoulders

Suitable for long runs where side clearance and forward position of indicator are not important factors

Sizes up to 8"

Wide range of indicators



### Dializers®

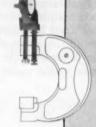
STANDARD Dializers provide an economical, effective means for converting your AGD Adjustable Limit Snap Gages to Dial Snap Gages.

Fit your present AGD frames of any make, or, if desired, we can supply frames up to 26%."

Dializers can be easily installed and transferred from one frame to another

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The easy way to gain greater efficiency with greater economy



### SF SERIES . . .

Designed for situations where low cost is an important factor and requirements do not suggest need for Paralloc models.

Light weight, sturdy, special aluminum frame

Fitted with Dializer

One contact radiused

Long range of adjustment Easily adaptable to many

Sizes to 131/2"



Write for details on any or all of these models

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## **Machining Stainless Steel**

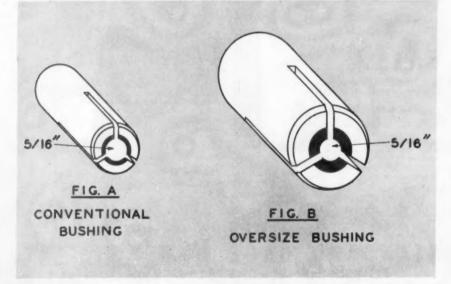
Larger carbide bushing insert solves Swiss automatic machining problem on stainless part.

By G. J. STEVENS

Machining Engineer, Armco Steel Corporation

**Problem:** When a Type 303 5/16-inch stainless steel part was being machined in a Swiss automatic, the carbide insert employed in the bushing heated up in the process and froze to the material (Fig. A).

**Solution:** An oversize bushing with a larger carbide insert was used. The larger carbide insert permitted the heat to be dissipated, which prevented the material from galling and freezing to the bushing (Fig. B).



In performing a machining job on a stainless steel part in a Swiss automatic, the type of carbide insert bushing shown in Fig. A was replaced with an oversize bushing of the type shown in Fig. B, which has a larger carbide insert which is designed to dissipate heat more readily and thus prevent the material from galling and freezing to the bushing.





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Crucible's REX® high speed steel always scores highest in performance—as it has for more than a half century. That's because it is consistently sound and uniform in structure... with dependable response to heat treatment.

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REX is immediately available at all Crucible warehouses, or on prompt mill delivery. For a list of helpful data on REX and other special steels, write for a free copy of the "Crucible Publication Catalog." Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

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# **NEW DUMORE TOOL POST GRINDER**

(3 H. P.)

turns standard machine tools into heavy-duty grinders

YOUR PRESENT EQUIPMENT PLUS A DUMORE "25" WILL CUT YOUR GRINDING COSTS ON THE BIG JOBS

"Impossible" external grinding jobs are now easy and economical with the new Dumore Series 25 Tool Post Grinder. Simply mounting it on your present machine tools—lathes, vertical boring mills, planers, shapers and other standard machine tools.

Mounted on a 20" or larger lathe, the Dumore Series 25 grinds and finishes all types of cylinder work. Motor and quill can be turned end-for-end for back of lathe mounting. On a planer it handles the largest surface grinding jobs easily... saves hours of set-up and transfer time on vertical boring mills.

A 3 H.P. induction motor gives controlled wheel speed, even under severe load. Built-in magnetic starter, overload protector and greased sealed bearings. 12-in, wheel capacity.



THE FAMOUS DUMORE QUILL . . . HEART OF THE GRINDER

Universally recognized for precision. Timken precision roller bearings are grease-lubricated and pre-loaded at factory. Radial capacity, 955 lbs.; thrust capacity, 655 lbs. Swings wheel 12" x 1½" at 1750 rpm.

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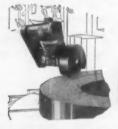




MOUNTED ON LATHE



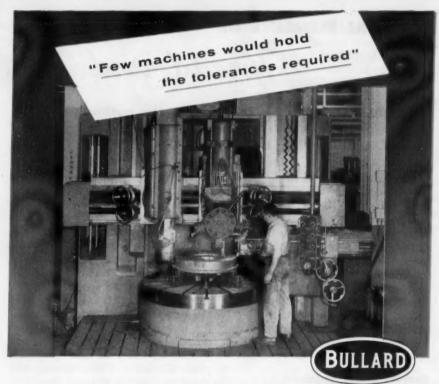
MOUNTED ON PLANER



MOUNTED ON VERTICAL BORING MILL

modern machine shop

September, 1956



This statement by Mr. R. P. Feiser, Industrial Engineer of the York Corporation, York, Pa., is one of the reasons for their purchase of a 66" Cut Master, V.T.L., Model 75 for the machining of a rotor support for their turbomatic compressor.

Mr. Feiser further states that "the 66" Cut Master does this machining at a saving of 40% over any previously used machine. In addition, the pendant control and power swiveling turret head are a great convenience in operation — the result is a low operator fatigue factor. Also, the York Corporation has experienced low maintenance costs on a 60" Vertical in operation since 1928 and a 36" Vertical in operation since 1937."



How about you?

Are you employing these same advantages to your machining problems?

If not, may we recommend that you get the complete Cut Meeter V.T.L., Model 75 story by calling your neerest Bullard Gales Office, Birthouter or writing for a calling to

THE
BULLARD
COMPANY

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### **ESSENTIAL ELEMENTS OF**

# Thread and Form

In concluding this three-part article, the author discusses the design of blanks to be thread rolled, as well as typical thread rolling applications.

By CLIFFORD T. APPLETON

Vice President, Reed Rolled Thread Die Company

The blanks used for thread rolling are smaller in diameter than the major diameter of the finished thread. When rolling the threads, the dies penetrate the surface of the blank to form the roots of the threads and in so doing, force the displaced material radially outward to form the crests and the major diameter of the thread.

### **Correct Blank Required**

Since rolling does not remove or compress material, it is necessary that the blank does not contain more than the correct amount of material to form the finished thread. Otherwise, the thread rolling dies will become overloaded.

As the volume of the thread above the pitch diameter of an American Standard thread form (when using a thread depth equal to twice the addendum) very nearly equals the volume of the material displaced, it becomes apparent that the diameter of the blank approximates the pitch diameter of the finished thread. This also holds true on similar types of threads which have a balanced thread form—where addendum and dedendum are equal.

Since variation in the diameter of the blank results in variation in the major diameter of the thread, it is necessary that the blank diameter tolerances be controlled according to the accuracy of the thread to be produced. In general, blank diameters should be less than the maximum pitch diameter of the thread, and blank diameter tolerances should be as small as practical for economical manufacture.

#### **Blanks Should Be Uniform**

Blank diameters are prepared in a number of ways. For common fasteners, such as bolts, cap screws and machine screws, the blanks are cold forged in heading machines. Close blank tolerances are maintained with carbide heading dies. Many parts are prepared for rolling on screw machines with the use of shaving tools. For very accurate threads with high hardness, the blanks are usually centerless ground. Overloading of dies with hard material is very detrimental to die life, and conse-

# Rolling

quently close control of the blank is required.

Blanks should be as round and straight as possible, as rolling will not entirely correct these inaccuracies. Variation of diameter along the length of the blank should be avoided as uneven distribution of pressure may overload the dies and result in reduced die life.

No matter how the blanks are prepared, the blank diameters should be kept as uniform as possible to assure uniform accuracy in the finished threads.

#### Rates of Production

Production rates vary with the nature of the work, hardness and kind of material and the equipment used. The rate of production is usually less for harder materials and where the work is difficult and slow to handle. A comparison of the approximate production rates of the different types of thread rolling machines is shown in the accompanying table. The rates given apply to thread diameters of 1/8 through 4 inches and for parts made of soft carbon steels. Since threads are normally rolled on automatic screw machines without reducing spindle speeds, the rate of production obtained is usually determined by other factors that control the time cycle of the machine.

To secure the most satisfactory rolling conditions and die life, it is important that the proper type and size of equipment be used. Rugged equipment with ample power is required to roll threads on heat treated parts.

The best rolling conditions and maximum die life can only be obtained when correct die speeds and number of blank revolutions are used

Diameter of Thread	Rotary Planetary	Reciprocating	Cylindrical Die
1/8 1/4	400 - 1600 400 - 1200	60 - 175 60 - 125	21 - 100 21 - 90
1/2 3/4	150	60 - 80 40 - 60	26 - 70 21 - 40
1 2		30	16 - 25 6 - 16
3	2147		4 4

Table showing comparison of the approximate production rates of the different types of thread rolling machines. The rates which are given apply to thread diameters of 1/8 inch through 4 inches and for parts that are made of soft carbon materials.

### Thread Rolling . . .

for rolling the thread. This is particularly true when close accuracy for roundness and size is required, especially on harder materials. Too many revolutions of the blank may have a tendency to work-harden some types of materials, and thereby reduce the life of the dies.

The shape of the rolling face of a flat die determines the amount of die penetration for each revolution of the blank. The penetration rate is usually much greater at the beginning of the rolling stroke than at the end.

When using cylindrical dies of thread rolls, the rate of penetration is controlled by the amount of feed applied to the dies for each revolution of the blank. The die penetration per revolution of the blank varies with different equipment, kinds of work and types and hardnesses of materials rolled. Lower penetration rates apply to the harder materials, hollow parts or non-rigid parts.

### **Typical Applications**

A few applications will illustrate what thread rolling is doing for users of the process. An engine manufacturer using a cylindrical die thread rolling machine for producing Class 5 threads on 15%-inch diameter cylinder head studs obtained over a 50 per cent savings in his manufacturing costs. Also connecting rod bolts were redesigned for rolling with costs reduced as much as 67 per cent. The uniformity with which these exacting tolerances are maintained in-



For more data circle 317 on Reader Service Card





LONG SHOULDER TYPE - Small toe clamp. Use to keep guide pin in bushing during stroke. Long wearing bronze plated on hardened steel, %" to 3" pin dia.



HEAVY DUTY—Large toe clamp, for large and heavy die sets requiring extra bodand shoulder thickness. Bronze plated 2" to 3" pin diameter.



MUT TYPE—For wide range of requirements. Available in 5 sizes, 1" to 2" pin diameter, long-wearing bronze plated on hardened steel.

### GUIDE PINS and GUIDE PIN BUSHINGS

Because high production, quality control and longer die life have become all-important, most stamping plants have now standardized on Lamina guide pins and Lamina bronze-plated bushings.

All Lamina wring-fit bushings are pre-finished on the LD. Seated on a ground shoulder square with the surface of the die shoe and secured by special retainers, they assure distortion-free, full bearing surface that results in better die alignment, less maintenance and longer die life. Lamina guide pins are special tool steel, heat treated, spray quenched, ground and burnished. The uniform, hard surface resists wear and the tough core prevents bending during installation or use. The pins are dimensionally accurate, do not "mushroom" or get out of round, and require no "running in".

There is a type and size Lamina Guide Pin and Bushing for every need. Our new catalog gives illustrations, applications, dimensions and prices of more than 800 items. Write for free copy,





LONG SHOULDER TYPE—Large clamp, Long bearing surface contains pin during entire stroke. 2" to 3" pin diameter. Bismaze on steel.



SHORT SHOULDER TYPE—For die space, more bearing area within die area. Bronze on sheel or solid Ampco Bronze. 7 lengths, pin sizes 16° to 2°.



RING CLAMP TYPE—For heavy duty and bossed die sets. Bronze-plated steel or Ampco Bronze, 4 longths, pin diameter 244 to 414.

For more data circle 318 on Reader Service Card

### Thread Rolling . . .

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because of the high degree of surface finish

produced by rolling. A better

flow of oil in the

because of the improved capil-

lary action pro-

vided by the

eners in the

range between

1/8 and 1/4 inch in diameter are

being rolled in planetary type

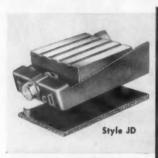
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September, 1956

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### Thread Rolling . . .

The aircraft industry has accepted thread rolling as the established process for producing smooth precise threads on aircraft parts. The increased tensile and shear strength and increased resistance to fatigue are of prime importance in aircraft where reduction in weight

and size is important and strength per pound is vital. Premature fatigue failures are not likely in rolled threads because defects on the surface of the thread that can serve as focal points of stress and starting points for fatigue are not present.

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> increases the life of the mating gears. This is especially true where non-metallic gears are used. Heat treatment of the worms has been eliminated in a number of worm drives since the rolled threads have a smooth work - hardened surface. Uniform accuracy made assembly easier and reduced inspection costs.

The use of form rolling of knurling, serrations and splines in thread rolling machines is increasing rapidly. In some instances the rolled knurling or serration on the part is used to broach its own toothed hole

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### Thread Rolling . . .

in the mating part, while in other cases, the serrations and splines are rolled more precisely to fit gages. Where the form rolling is used the cost savings are very substantial due to the high rate of production.

Thread rolling is widely used for small production quantities. Cylindrical die type of thread rolling machines are versatile for jobbing work. Setup ordinarily requires from 1/2 to 1 hour's time and since the operating rate is very fast, small quantities can be produced at very low cost. Highly skilled personnel are not needed; both men and women are used for setup and operating.

Screw machine shops are also finding thread rolling attachments for their automatics increasingly beneficial for small quantity lots. Trouble-free threading and the ability to thread at the collet end of the work behind shoulders without a secondary operation have made thread rolling very attractive for small and medium size runs.

The subject of thread and form rolling is an extensive one and in this brief review only a few of the essential elements have been discussed. The development of the process is by no means completed. There is more interest and activity today than at any time in its history. New applications of the thread rolling process are being found daily where speed, accuracy, increased strength and material savings will reduce cost and improve the quality of an endless number of fasteners and other threaded components.

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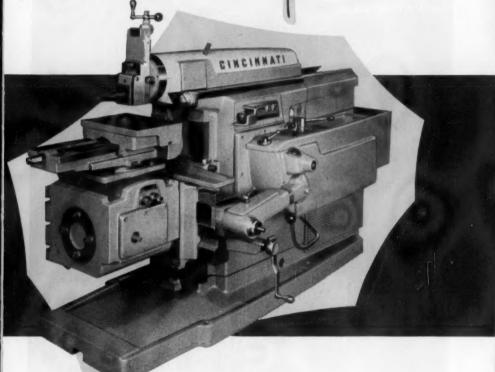


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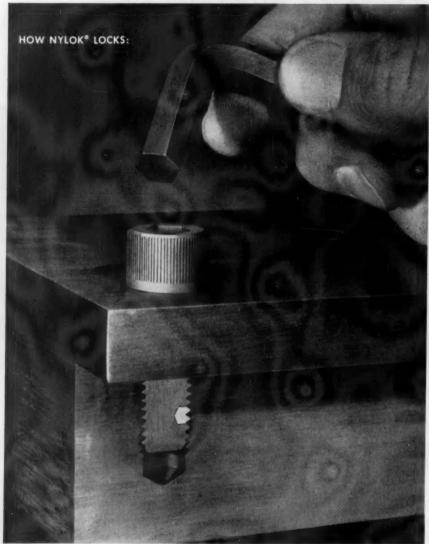


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### UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.



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176

ideas from readers

### ideas from readers

Several time-saving suggestions for the man in the shop.

### Improved Pry Bar Prevents Marking of Dies

By ERNEST J. URBAS

An effective way to prevent or avoid marks on dies is to equip diemakers with an improvement of the ordinary pry bar. Because of the numerous times that a pry bar is applied to a die during bench assembly, many marks are imbedded in the surface of the die set. These

A B

(A) Pry bar with a spherical ball welded to the chisel-like end. (B) Pry bar with a short round bar welded in place.

marks are caused by the chisel-like end of the pry bar.

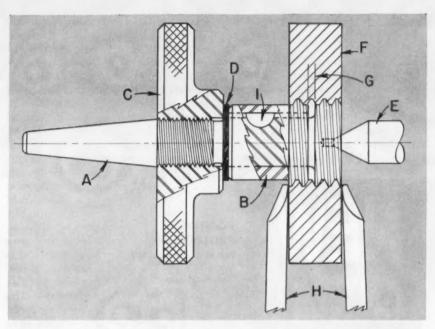
To eliminate this condition, we recommend the following procedure: Grind a slot about  $\frac{3}{8}$  inch deep in a 1-inch round ball bearing and fit this slot over the chisel end of the pry bar, as shown at A in the accompanying sketch. Now weld or braze the ball to the bar and you will have a non-marking friction-free tool.

Another adaptation of this idea is to use a piece of round bar stock instead of a ball bearing, as shown at *B* in the sketch.

### **Nut Facing Mandrel**

By H. J. GERBER

There are occasions where it is desired to turn simultaneously both face surfaces of internally threaded parts, such as thrust adjustment nuts. After a part of this type has been drilled and tapped on a turret lathe, it is somewhat of a problem to true up both face surfaces exactly square with the thread.



Sketch of an efficient mandrel for use in performing precision nut facing operations.

The problem increases if there is a variance in pitch diameters between different pieces of a batch. The writer has found the mandrel shown in the accompanying sketch to be accurate and efficient for precision nut facing operations. An advantage of this mandrel is that it is self-compensating for nuts which are on the loose side of the tolerance.

The mandrel consists of three major parts. The central arbor A is turned between centers with a taper to fit the spindle socket of the lathe to which it is to be fitted. A thread, of the same size as that in the workpiece, is chased on the opposite end. This threaded portion is only approximately half as long as the thickness of the workpiece. Another

thread, of any desirable pitch, is chased for a short distance on the shank near the taper. A Woodruff keyseat is milled into the body between these two threads.

Sleeve *B* is bored to fit snugly on the body diameter of part *A*. It is then placed between centers on a mandrel and a thread of the same size as in the workpiece is chased at one end. The opposite end is carefully faced square with the axis. A keyway of proper size is then broached through the bore to accommodate the key *I*.

Hand nut *C* is turned and threaded to fit the thread adjacent to the taper shank on piece *A*. In addition, the hand nut is knurled for ease in gripping. A fiber washer of correct

### ideas from readers . . .

size to fit onto the o.d. of arbor A is also provided, as indicated at D.

Operation of the nut facing mandrel is as follows: All parts are assembled as illustrated and the taper shank of arbor A is inserted into the head spindle socket of the lathe. The outer end of the assembly is support-

ed on the tail center E, of the lathe. The workpiece, F, is then threaded onto both parts A and B. A small gap is left between the end of sleeve B and the threaded nose of arbor A as shown at G. When the workpiece is on the threads of both A and B. the hand nut C is turned forward slightly. This action forces the sleeve B forward (it is keyed to prevent rotation) and a jam fit is secur-

ed on the threads of the workpiece. This fit will hold even a loosely threaded workpiece in true alignment and is capable of resisting the torque exerted by the two facing tools, H, which are used to finish both sides of the work at one pass.

When facing is completed, a slight movement of the hand nut unlocks the thread and the work may be screwed off the mandrel. It is. of course, necessary that all parts be machined accurately and threads must be chased true with the center line of the mandrel.



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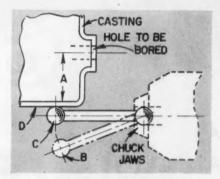
ideas from readers . . .

### Set-Up Rod for Jig Boring Work

By CLIFF BOSSMANN

When setting up a casting for a jig boring operation, it is sometimes rather difficult to establish, with an ordinary toolmaker's scale, the distance indicated as A in the accompanying sketch. To facilitate this job, a rod having a ball at each end can be used.

When the rod is clamped in the chuck of the boring machine, the rod has a tendency to wiggle, as indicated at *B*, when the chuck revolves. However, when the casting is moved toward the rod, the wig-



Sketch showing method for accurately setting up a casting for subsequent jig boring work.

gling action is decreased and finally eliminated altogether. When the wiggling stops, the jig borer is turned off and set. The distance A is established by moving the casting a distance which equals the sum of

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### ideas from readers . . .

distance A and one-half the diameter of the ball on the rod.

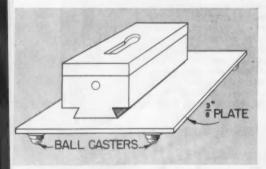
This setting-up method is especially useful when surface D of the casting is rough or uneven.

### \* \* \*

### **Dolly for Drop Forging Dies**

By B. A. LEE

Drop forging dies, notwithstanding the improvements that have been made in diesinking machines, still require a considerable amount of hand work in order to apply the finishing touches and polish needed to produce good forgings. Much of this work is performed on a bench, using hand files, flexible hand grinders and polishing wheels. Considerable twisting and turning of the dies is necessary in order to place them in a convenient position to reach into the pockets and cre-



Sketch of simple steel plate dolly for handling drop forging dies during finishing operations.

vices of the die cavity. These dies weigh in the hundreds of pounds and the task of turning and twisting them is not an easy one.

A simple means devised for maneuvering these heavy dies is a steel plate dolly such as shown in the accompanying sketch. This dolly is made from \(^3\)\%-inch plate of suitable size, to the four corners of which are attached heavy-duty ball casters that are commercially available.



Theory and Practice of Lubrication for Engineers. By Dudley D. Fuller. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 432 pages. Cloth binding. Price, \$10.50.

In this work, believed to be the first to give balanced treatment to theory and practice in lubrication. basic concepts are organized in the manner the author has found most practical in his teaching experience. After presenting a solid foundation in the theory of lubrication, he applies principles to a wide range of lubrication problems. Numerous examples are worked out in discussions of problems. Many bearing designs are given, including, among others, those for machine tools, turbines, generators, large motors, rolling mills, ball mills and centrifuges.

For researchers, Professor Fuller has deliberately included much material that should kindle the imagination and lead to individual study. Direct references are made to outstanding examples of recent research in lubrication. The techniques used and results achieved are

included in the discussions.

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The Hartford Special Machinery Co., 275 Homestead Ave., Hartford 12, Conn. Standard horizontal and vertical way type hydraulic feed units.

#### 33. Live Centers

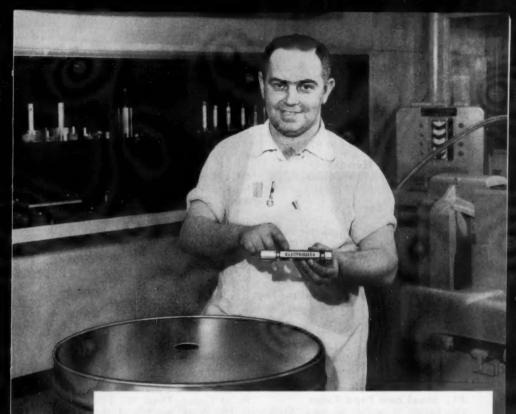
Ideal Industries, Inc., 1031 Park Ave., Sycamore, Ill. Complete line of live centers in a wide range of models and tapers.

#### 34. Size Control

Industrial Gauges Corp., Electro-Autosizing Machine Division, West Englewood, N. J. Electronic gage permits rapid setup and predetermination of desired size.

#### 35. Shears

Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill. Double angle and rotary shears, and combination shear, punch and coper.



### Lapping and Electrolizing



### **Exclusive T-P Pilot**

Here's another T-P Plus feature! The Taff-Peirce Pilot reduces inspection costs . . . radius' and groove on end of gage member prevents chipping and burring prolongs gage life. Available on single or double and plug gages.

### Make Taft-Peirce Gages Wear Many Times Longer!

Your money goes a long, long way when you order T-P Electrolized Gages! The combination of lapping plus electrolizing means that every gage will stay accurate, longer. Precision lapping produces an exact-sized gage - no "hills" and "valleys" to wear rapidly and destroy gage accuracy. Electrolizing puts an even film of hard, nonmagnetic alloy on all gaging surfaces to give exceptional wear resistance. Initially costing only slightly more than ordinary hardened steel gages, Taft-Peirce Electrolized Gages more than pay for the difference in longer gage life. Result: Your budget for gages goes much farther, and your inspectors work with the best accuracy you can buy. For more information, call or write: The Taft-Peirce Manufacturing Co., Woonsocket, R. I.

#### The Taft-Peirce Family

Air Gages Magnetic Chucks

**Tool-Room Specialties Grinding Machines** Precision Gages Lapping Machines



### TAKE IT TO TAFT-PEIRCE

THE TAFT-PEIRCE MANUFACTURING COMPANY WOONSOCKET, RHODE ISLAND T-P Means TOP Precision

### 36. Punch Press

L & J Press Corp., 1624 Sterling Ave., Elkhart, Ind. Open back inclinable punch press, capacity 14 to 90 tons.

### 37. Threading Heads

Landis Machine Co., Waynesboro, Pa. Hardened and ground threading heads.

### 38. Roll Grinder

Landis Tool Co., Waynesboro, Pa. Type 30 roll grinder is available in 36, 44, 50 and 60 inch swings and center lengths from 10 to 24 feet.

### 39. Welding Power Sources

The Lincoln Electric Co., Dept. 3507, Cleveland 17, Ohio. Lincolnweld power sources for variety of automatic welding applications.

### 40. Furnace

Lindberg Engineering Co., Furnace Division, 2469 W. Hubbard St., Chicago 12, Ill. Hydryzing furnace for hardening tool steels.

### 41. Steel and Tape Rules

The Lufkin Rule Co., Saginaw, Mich. Decimal graduated steel and tape rules.

### 42. Sheaves

Maurey Manufacturing Corp., 2915 S. Wabash Ave., Chicago 16, Ill. Ful-Grip Q-D sheaves, standard Multi-V sheaves and special made-to-order sheaves.

### 43. Hardness Tester

Mechanical Devices, Inc., Metallurgical Division, 10640 Harper Ave., Detroit 13, Mich. Peabody pocket size hardness tester.

#### 44. Microhoning

Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich. Microhoning service and equipment.

#### 45. Bed Type Mill

The Motch & Merryweather Machinery Co., 1250 E. 222nd St., Cleveland 17, Ohio. Mill-M-Matic bed type mill with automatic electrical control.

### 46. Indexing Head

Multiplex Co., 1536 Getty St., Muskegon, Mich. Motorized indexing head may be used for milling, grinding, boring and so on.

### 47. Machine Tools

National Machine Tool Builders' Assoc., 2071 E. 102nd St., Cleveland 6, Ohio. Motion picture list of films available on the subject of machine tools and machining operations.

### 48. Grooving Machines

Niagara Machine & Tool Works, Buffalo 11, N. Y. Modernized Model No. 48-U universal power grooving machines for metal products.

### 49. Rotary Table

Olson Industrial Products, Inc., 40 W. Water St., Wakefield, Mass. Combination rotary table and angle plate.

### 50. Shop Equipment

Parent Metal Products, Inc., Fourth St. at Locust, Dept. SC, Philadelphia 6, Pa. Work bench and shop equipment of steel.

### 51. Dial Indicator

Petz-Emery, Inc., Pleasant Valley, N. Y. Em-re 0.00005 inch dial indicator checks accuracy at location.

### 52. Plug Gage

Pratt & Whitney Co., Inc., 25 Charter Oak Blvd., W. Hartford 1, Conn. Go and Not Go reversible plug gage.

### 53. Keyseat Cutters

Quality Tool Works, 792 S. Market St., Waukegan, Ill. Woodruff keyseat cutters, T-slot cutters, dovetail cutters, milling cutters, lathe mandrels, combined drills and countersinks.

#### 54. Production Lathe

Reed-Prentice Corp., Worcester 4, Mass. Reedmatic heavy-duty production lathe available in two models, designated as the C-30 and C-60.

### NORBIDE.

DRESSING STICK



A NORBIDE Stick of boron carbide — the hardest manufactured abrasive commercially available . . . will outlast hundreds of ordinary abrasive sticks . . . greatly reduce dressing dust nuisance too.

A couple of passes with a NORBIDE Dressing Stick is all it takes to clean up a wheel face, dress a radius or groove or touch up a cup or saucer wheel. And — with this conveniently sized stick — you can see more of the wheel and avoid costly overdressing.



Making better products ... to make your products better

Order a supply from your local Norton distributor or write for Form 1567 for more details. NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.

NORTON PRODUCTS: Abrasives • Grinding Wheels Grinding Machines • Refractories BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Topes

NORBIDE® ... The hardest manufactured abrasive commercially available!

For more data circle 336 on Reader Service Card

### 55. Punches and Dies

Ring Punch & Die Co., 19 Fenton Place, Jamestown, N. Y. Precision punches and dies.

### 56. Grinding Wheels

Robertson Manufacturing Co., Dept. 58, P.O. Box 848, Trenton 5, N. J. Plate mounted and vitrified carbide grinding wheels.

### 57. Carbide Tools

Schmarje Tool Co., Muscatine 3, Iowa. Reamers, end mills, counterbores and other carbide tools.

### 58. Wipers

Scott Paper Co., Dept. 5-MM, Chester, Pa. Disposable wipers.

### 59. Furnaces

The Sentry Co., Foxboro, Mass. Sentry furnaces with enclosed diamond block method of atmosphere control.

### 60. Precision Lathes

Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill. Sheldon 10, 11 and 13 inch engine lathes, Sebastian 13 and 15 inch geared head lathes, horizontal type milling machine and 12 inch shaper.

### 61. Hydraulic Fluid

Shell Oil Co., 50 W. 50th St., New York 20, N. Y. Oil-base, fire-resistant hydraulic fluid—Shell Irus Fluid 902.

### 62. Collet

South Bend Lathe Works, South Bend 22, Ind. No. 5 South Bend collet fits all South Bend lathes with 10 inch and larger swings.

#### 63. Washers

Standard Pressed Steel Co., Jenkintown 22, Pa. PLI Washer (perload indicating) automatically controls tightening of bolted connections.

### 64. Torque Wrench

P. A. Sturtevant Co., Addison, Ill. Industrial torque wrench manual.

### 65. Grease

Sun Oil Co., Philadelphia 3, Pa. Sun C-891T grease is designed to stay put under the worst conditions of dirt, moisture, low speeds and high loads.

### 66. Bench Centers

Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. Bench centers for precision checking; balancing tools for small, medium or large work; and automatic index base.

#### 67. Furnaces

Surface Combustion Corp., Toledo 1, Ohio. Three models of Surface Allcase heat treating furnaces.

### 68. Rotary Grinder

Thompson Grinder Co., Springfield, Ohio. Type TR-12 inch twin rotary production grinder.

### 69. Reamers

Twentieth Century Manufacturing Co., Box 429 M, Libertyville, Ill. Complete selection of reamers.

### 70. Grooving Tool

Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. MM088 Truarc grooving tool.

### 71. Punching Unit

Wales-Strippit Corp., 345 Payne Ave., N. Tonawanda, N. Y. CJ units that are completely self-contained with punches, dies and stripping elements built into the holders.

### 72. Cutting Tools

The Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, Ohio. End mills, end mill holders, Tu-Lip counterbores, new type countersinks and deburring tools, angular cutters, sharpening fixtures and high speed steel and carbide form cutting tools.

#### 73. Band Saws

W. F. Wells & Sons, Three Rivers, Mich. Complete line of variable speed band sawing machines for metal.

### FREE!

### Page after page shows the correct abrasive wheel to use

(for the best Blanchard grinding results)





Blanchard wheels in silicate, resisoid and vitrified bonds.

This is our famous booklet *The* Art of Blanchard Surface Grinding—brought up-to-date with a third edition. It contains complete descriptions of our silicate, resinoid and vitrified bonded wheels. It also describes a number of jobs and shows you how to select the correct wheel for each job. Every Blanchard operator should have a copy handy—send for yours today.

Blanchard wheels are guaranteed for uniformity of grade. They're best for Blanchard grinders, best for every job. They give you maximum production, utmost economy . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.



### THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS.

THE BLANCHARD MACHINE CO. 64 State St., Cambridge 39, Mass,

Genslemen:

For more data circle 337 on Reader Service Card

September, 1956

modern machine shop

191

### **Tools Make the Difference**

A Guest Editorial

By GEORGE S. BENSON
Director, National Education Program,
Searcy, Arkansas

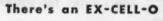
Walking through the big Boeing Aircraft Plant in Wichita, a visitor comes upon mammoth machine tools, some of them being handled by one or two operators. For example, there is a big press at work on the right of the aisle in one building. It is shaping the thick aluminum wing "skin" for a B-52. One man handles the electric switches on this machine. The machine cost Boeing several hundred thousand dollars. The employees operating such machines receive weekly pay checks that are high when measured by any standard of compensation.

Airplane companies, like virtually all American industries, invest big money in their machine tools. The payoff rewards everybody. Production costs have been cut, and production time lowered. Productivity has been boosted. More value has been built into the product. Pay checks have increased.

When we compare the American system with other systems, the tool story is the most striking example. When I lived in Kwei Hsien, Kwong Sai, South China, I burned kerosene that had been carried a hundred miles overland on the shoulders of coolies. It had been delivered by American ships to Pak Hoi, in five gallon tins. At Pak Hoi a coolie would tie a five gallon tin to either end of a bamboo pole, get under the pole, and start trotting on the road to Kwei Hsien.

These coolies with their primitive bamboo-pole tool would trot about ten miles a day. It took one 10 days to make the hundred miles from the ships dock in Pak Hoi to Kwien Hsien. How much were they paid? The wages when I was in China were the equivalent of 10-cents in our money. When a coolie had worked 10 days and earned a dollar, he had transported 10 gallons of kerosene a hundred miles. That meant 10-cents per gallon freight rate—a very high freight rate, but miserable wages.

To transport kerosene in this country, we put down a road bed, wooden ties, steel rails. We build a great locomotive, tank cars, loading facilities, terminal facilities. Then a man gets behind the throttle and drives across the rails carrying a



## Precision Spindle

BUILT ESPECIALLY FOR YOUR WORK driven internal pinding spindle.

5,000 rpm high frequency inbuilt motor spindle.

Wh 24" grinding wheel.

Totally enclosed liabuilt man

Precision introlly metar spindle for euter grinder.

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EX-CELL-O High-frequency Spindle, reted at 40,000 rpm, grinds small holes in bushings.



MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAIROAD PRIS AND BUSHINGS BERLUNG BUSHINGS • AIRCRAFT BIRD MISCELLANDUS PRODUC TION PARTS • DAIRY EQUIPMENT For production grinding to precision limits "just any spindle" won't do. It must be carefully selected to suit the work. From Ex-Cell-O's widely-varied line of precision spindles you can select a standard model, or we'll make one special to your requirements. These spindles have long been the original equipment choice of leading manufacturers.

Features of the line include:

Rigidity
Permanent adjustment
No vibration, no chatter
Precision ball bearings preleaded for
predetermined speeds

Phone your Ex-Cell-O representative, or phone or write Ex-Cell-O in Detroit, for CATALOG LISTING HUNDREDS OF STANDARD GRINDING SPINDLES

56-36

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

For more data circle 338 on Reader Service Card

# Reasons why you should use GAMMONS DIE REAMERS

Specially treated for today's modern die steels.

1

Rapid cutting capacity.

Tapers per inch .005, -.008, -.013 in stock.

> Large range of standard sizes in stock at all times for your convenience.

WRITE FOR COMPLETE INFORMATION

GAMMONS . HOAGLUND CO.

MANCHESTER 2. CONN.
Manufacturers of helical taper pins, chucking,
die makers and special reamers.

For more data circle 339 on Reader Service Card

### Tools Make the Difference . . .

hundred tank cars, with hundreds of thousands of gallons of kerosene, and he's moving at an average speed of 50 miles an hour. To transport the kerosene a hundred miles takes two hours. And what wages do the American railroad workers receive in comparison to the Chinese coolies? The American gets a minimum of \$10 a day, an average of \$15 a day.

The freight rate on the American railroad is less than a cent per gallon per hundred miles, instead of ten cents as in China. What's the difference? It is the tools. The coolie has a 10-cent tool investment and he makes 10-cents a day. The tool investment in America for each railroad employee is approximately \$20,000. That is the difference.



"Watch it Joe . . . you're going to be working to pretty close tolerances on this job!"

### Sibley Table Swing Saves Set-up Time!

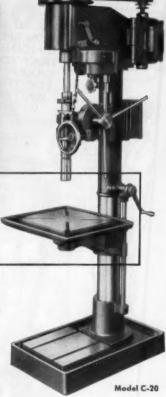


Lick largest cost item in toolroom, die shop-or small lot production! Rapid positioning by rotating table arm overcomes

- Geared power feeds. Dial selection.
- Back gears for extra power.
- Drills 11/4" in steel plate.

need to change set-up.

- Accurate. Rugged. Convenient controls. Eight spindle speeds.
- · Sensitive for "feel" of job.
- 20" swing. 2 h.p. motor.







Free Catalog!

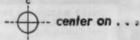
**JIBLEY** 

MACHINE & FOUNDRY CORP SOUTH BEND, INDIANA SIBLEY MACHINE & FOUNDRY CORP. Dept. MM5-9, South Bend 23, Indiana Send Catalog No. 67

State

For more data circle 340 on Reader Service Card

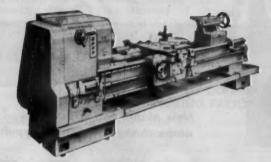




### cincinnati



Large size prints of this J. R. Williams cartoon are available for framing.



Lots of folks who know about Cincinnati Tray-Tops don't know that every size has a full set of accessories available. And even more folks don't know that the famous Tray-Top line has been expanded to include a 21½" and a 26" size. Tray-Tops are the low-priced lathes with the high-priced features:

1. All geared headstock

2. 12 spindle speeds in geometric progression 3. Direct-reading, speed-shifting mechanism

4. Large spindle mounted in three antifriction bearings

5. Flame hardened gears in headstock, quickchange box and apron

6. Cabinet legs on the 10", 121/2", 15" and 18" sizes

7. Enclosed quick-change box with lead screw

8. One shot lubrication of the ways

9. Ground ways (flame hardened at extra cost)

10. Tray-Tops on headstock and tailstock

11. One piece, double-walled apron with automatic lubrication

12. Fully enclosed electrical panel, built-in disconnect, transformer, motor and controls (all standard equipment)

13. Complete operating and service manuals

14. Bullt-in leveling jacks

We also make a complete line of floor, bench

and radial drilling machines.

For complete catalogs, prices and the name of your local dealer, write on company letterhead to Cincinnati Lathe & Tool Co., 3261 Disney, Cincinnati 9, Ohio.



For more data circle 342 on Reader Service Card

news of the industry

### news of the industry

New plants and expansions . . . company name changes . . . new appointments

### DOALL INAUGURATES NEW EDUCATIONAL SERVICE

As an educational service to industry, The DoAll Company, Des Plaines, Ill., now offers detailed information to all users of gage blocks that will permit them to set up a program whereby they can inspect and calibrate their own gage blocks accurately with only a few items of simple equipment and without expensive air-conditioning fa-

cilities. This educational service, as set up by The DoAll Company, has received approval by the National Bureau of Standards.

The program is entitled "How to be Your Own Bureau of Standards." It provides a free, four-day, comprehensive training course at the DoAll Technical Institute, Des Plaines, Illinois. The training course combines both classroom sessions and laboratory practice. The classroom sessions are con-



The above illustration shows all of the equipment that is needed in order for you to make a quick inspection and accurate calibration of your own gage blocks directly in your shop.

cerned with orientation, principles and techniques of interferometry, dimensional controls for tolerances, preparation and interpretation of calibration records, effects of temperature, observational error and so on. In the laboratory, actual procedures, operation of instruments and recommended methods of calibration are practiced. For this practical training work, each trainee is requested to bring a set of his company's own gage blocks.

At the conclusion of the course he will have made a thorough inspection and recalibration of these gage blocks, making up a report recording the actual dimension of each block.

For those gage block users who do not elect to send their quality control men to the training course. The DoAll Company has published a manual of metrology entitled "How to be Your Own Bureau of Standards" written in non-technical language and illustrated to reveal the procedures and the equipment required to set up a program of gage block inspection and calibration.

Persons desiring more detailed information and reservations to enroll in the free training course, "How to be Your Own Bureau of Standards," are requested to call any local DoAll Sales-Service Store or write The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.

### \* \* \*

### KENNAMETAL TO EXPAND MANUFACTURING FACILITIES

Kennametal Inc., manufacturer of cemented carbide products, has an-



### ABRASIVE DIVISION, DEPT. P ELGIN NATIONAL WATCH COMPANY

Elgin, Illinois

For more data circle 343 on Reader Service Card

### news of the industry . . .

nounced the purchase of a 1,200-acre tract of land near Latrobe, Pa., for the expansion of manufacturing facilities and to permit further decentralization to minimize damage from future floods. An official stated that the company plans to develop the area at once. The first installation will provide about 25,000 square feet of floor space and

will be utilized for grinding and finishing of special or custom-fabricated carbide products. This unit is expected to be in production by the end of the year.

The decentralization of the firm's manufacturing activities in the Latrobe area was instituted about five years ago with the building of a plant at Bedford, Pa., for manufacturing tools for the mining industry. In 1954 the firm estimated a flood damage of \$417,000 to facilities in its main plant in

Latrobe. Since then plants have been built or acquired in Detroit, Mich., and Willoughby, Ohio, the latter having been established within the last few months.

Kennametal Inc. is one of the leading producers of cemented carbide products for the metal working, mining, woodworking, chemical processing and other industries.

### SUPER TOOL APPOINTS PRESIDENT

It was recently announced that Kenneth R. Fisher of Grosse Pointe, Michigan, has been appointed president of Super Tool Company, Detroit subsidiary of Van Norman Industries, Inc.



Whether you feed stock from 100 pound coils or 40,000 pound coils, there is a Littell Automatic Centering Reel to meet your needs . . . motor driven, electric brake and plain brake reels. Every Littell Reel is designed for swift, safe coil replacement and smooth, controlled uncoiling. All

REELS

designed for swift, safe coil replacement and smoot controlled uncoiling. All models combine smooth running accuracy with rugged construction that assures extra years of dependable service.

No. 25-18—Littell Motor Driven Automatic Centering Reel With Arm Control. Coil Capacity, 2,500 lbs.

Ask for a Littell Coil Weight Calculator

Write for Littell Reel Catalog Data



For more data circle 344 on Reader Service Card

### **New SKIL 4" DRILL**

... up to 40% more powerful than other drills in its price range!



SKIL now offers the greatest 1/4" drill value on the market . . . for faster, easier, more accurate drilling in maintenance and production! Much more powerful than comparable makes. Yet its light weight and new pistol-grip design make it easier to handle. Quality SKIL features assure long life under rugged use. Put this new SKIL Model 134 on your production or maintenance team-for only \$34.50!

Call Your SKIL Representative Today For FREE Demonstration and FREE Trial!



Model 134 . . . Only \$34.50

- Capacity in steel, 1/4"; in wood, 1/2"
- Net weight, only 31/4 lbs.



- Now dura-plastic finish for easier. more positive grip!
- Quality geared chuck for fast, accurate bit changing!
- Ball bearing spindle for longer service, greater precision!
- Large inspection plate for easy routine maintenance!

Made only by SKIL Corporation, formerly SKILSAW, Inc. 5033 Elston Avenue, Chicago 30, Illinois • 3601 Dundas Street West, Toronto 9, Ontario Factory Branches in ALL Leading Cities

WHEN YOU BUY A DRILL, BE SURE IT'S A SKIL!

For more data circle 345 on Reader Service Card

### news of the industry . . .

Mr. Fisher has been connected with Super Tool Company for eight years in the capacity of sales manager and executive vice president.

Super Tool Company produces a full line of carbide cutting tools and operates plants in Detroit and Elk Rapids, Michigan, and Glendale, California, with warehouses in principal industrial areas. Super Tool Company was acquired by Van Norman Industries, Inc., in 1955 from the family of the founder. Conrad Birgbauer. In addition to Super Tool Company, Van Norman Industries owns and operates Morse Twist Drill & Machine Company, producers of high speed and carbon cutting tools at New Bedford. Mass.: H. W. Butterworth & Sons Company, producers of textile machinery at Bethayres, Pa.; Van Norman Machine Company, producers of machine tools and Van Norman Automotive Equipment Company, both at Springfield, Mass.; and Transitron, Inc., and Insuline Corporation of America in the electronic and electronic mechanical fields, both of which are located at Manchester, New Jersey.

### \* \* \*

### D. C. FONDA GAGE COMPANY OPENS NEW PLANT

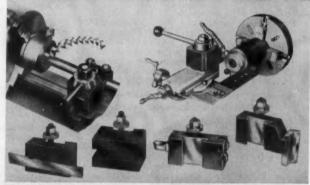
The D. C. Fonda Gage Company, manufacturer of "ultra-finish" rectangular and square gage blocks (in steel and carbide with accessories), recently announced the opening of a new, modern plant located at 200 Henry Street, Stamford, Conn. Douglass C. Fonda, the founder of this company, has appointed James R. Hanlon as general sales manager of the organization.

# GET THE MAXIMUM FROM YOUR LATHES by using the ALORIS "Quick Change" PATENTED TOOL POST and HOLDERS

Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- . RUGGED CONSTRUCTION.
- TESTED AND RECOM-MENDED BY LEADING LATHE MANUFACTURERS.
- . GREATER RIGIDITY.
- . SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and price list.



ALORIS TOOL CO., INC.

131-37 SANFORD AVENUE FLUSHING 55, N. Y.

For more data circle 346 on Reader Service Card

DO IT BETTER — QUICKER — AT LESS COST



SOLID CARBIDE Atrax stock tools
eliminate the waste + worry
of "specials" 99 times
of "specials" 100!

### STANDARDS!

All of the standards in the Atrax line were once "specials"—engineered and built to meet specific production demands. When the Atrax requirements of performance and dependability were proved, these tools were stocked as standards at standard prices—and are now available without delay, to meet virtually all metalworking needs. Whenever you're faced with a tough job, consult the Atrax catalog listing over 1000 standard tools before you order a "special". A production-proved tool to do the job—and do it right—is undoubtedly in stock. Always Specify Atrax, you can't get a better tool—you can't get better performance.

Eliminate the cost and delay of "specials"—send today for the Atrax catalog illustrating more than 1000 solid carbide tools to do 99% of all metal working jobs!





THE ATRAX COMPANY
Newington 11, Conn.

For more data circle 347 on Reader Service Card



# Misser

LAY-OUT (Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—plus easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

Write for circular on company letterhead

MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave., Detroit 13, Mich.

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204

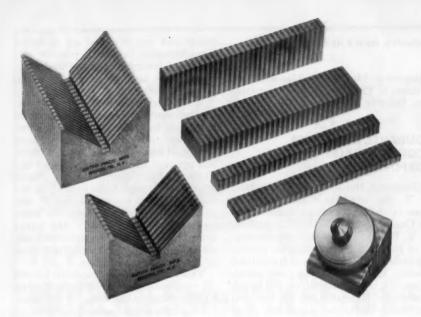
### news of the industry . . .

### NATIONAL BROACH AND MACHINE DELIVERS 2,000TH GEAR SHAVER

Manufacture of the 2,000th Red Ring rotary gear shaving machine by National Broach and Machine Company, 28-year old Detroit machine tool builder, was announced recently by Walter S. Praeg, president. The precision machine is a Model GCU high production fully automatic type equipped with an automatic loader and will finish the teeth on a 1-inch diameter automotive transmission helical gear to ten-thousandths of an inch tolerances in 16 seconds. The machine has been



Walter S. Praeg, president of National Broach & Machine Company, standing by the 2000th Red Ring shaving machine made by his company. In his hand he holds a 1-inch diameter automatic transmission gear whose teeth the machine will precision-finish in 16 seconds.



Anton Magnetic Products Parallels, V-Blocks,
Adjustable V-Blocks,
Unfinished Blanks and
Diamond Holders

- Eliminate expensive grinding set-ups.
- Speed up production.
- May be cut and shaped to fit your job.
- Highest Quality Reasonably Priced.

Write for illustrated catalogue sheet, listing prices, features and specifications

### **Anton Machine Works**

1226 FLUSHING AVENUE . BROOKLYN 37, NEW YORK

For more data circle 349 on Reader Service Card

### industry news in brief . . .

delivered to Marvel-Schebler Products Division of The Borg-Warner Corporation, Decatur, Illinois,

### \* \* \*

### HOUDAILLE INDUSTRIES ACQUIRES WALES-STRIPPIT CORPORATION

Houdaille Industries, Inc., Buffalo, N. Y., has announced the cash purchase of the assets of the Wales-Strippit Corporation of North Tonawanda, N. Y. Wales-Strippit is a manufacturer of patented interchangeable punching tools, as well as a line of specialized machine tools for working sheet metal. Moreover, the product lines will be expanded by Houdaille, which has also purchased the trade names and copy-

rights and has executed an exclusive manufacturing license to produce under these patents developed and owned by the inventor and originator, George F. Wales.

Wales-Strippit is a 31 year old business currently employing 430 people in its 75,000 foot plant and has enjoyed continual and profitable growth over its life. It has expanded its sales about 333 per cent in the past five years until it is now overflowing its North Tonawanda plant. Sales in the past six months of 1956 are at the annual rate of five million dollars. Houdaille plans to promote progressively its sales growth and will supply, as needed, additional productive capacity from some of its existing plant areas.

This acquisition by Houdaille follows its established policy of discontinuing and replacing non-profitable manufacturing lines at the same time it is ex-



For more data circle 350 on Reader Service Card



Combines a drill table, a vise, a set of parallels and V block. No more lost fingers, from hand held jobs that slip. No more 30 minutes set-ups for a 1 minute drilling operation. Made in 6 sizes, from 8" to 28" dia. We guarantee each Safety Drill Table will save its cost on labor alone in 6 months, to say nothing of plant down time when vital maintenance is delayed even a few minutes

### WRITE FOR FREE FOLDER

Shows many typical set-ups, and use in radial drills. Complete specifications on all models. Covers MONEY BACK GUARANTEE and 30 DAY FREE TRIAL OFFER.



MODERN MACHINE TOOL CO.
2005 LOSEY AVENUE
Jackson, Michigan

For more data circle 351 on Reader Service Card

### news of the industry . . .

panding and diversifying in other businesses.

Wales-Strippit has sales offices and distributes its products in the United States and in Canada and enjoys some export business as well. There will be no change in either staff or employees.

### ACE DRILL BUSHING HAS AWARDS BANQUET

More than 250 persons and a surprise guest were present at the first company-wide awards banquet given by the Ace Drill Bushing Company, Los Angeles, Calif. It was a night for special recognition by management of the faithful, cooperative efforts of many of its employees and was presided over

by Alan A. Fisher, president, who founded Ace Drill Bushing Company a little more than 15 years ago in an old, abandoned service station. The company is now recognized as one of the major producers of drill bushings in the entire world.

Fifteen year service award certificates were presented to Alan A. Fisher, president, and Martha M. Fisher, secretary-treasurer, by George C. Beck. Then Mr. Fisher reversed the procedure and recognized the ten year service of Mr. Beck, as well as Allen V. Brown, Frank M. Fleming and Del Herrick. He also made a five year presentation to George Clement.

Following this, George T. Smith



Low cost because Kenco presses are quality-built throughout to produce at top speed, and with the least downtime you've ever experienced.

Precision stamping—a result of unusually rigid frames... extra long ram guides and slides that permit full use of the guiding area at the bottom of the stroke.

Send for full details on money-saving Kenco presses.

### KENCO MANUFACTURING CO.

Mfrs. of Precision Machinery and Accessories.
5211-A TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

For more data circle 352 on Reader Service Card



METAL CUTTING MACHINE



### EXTRA CAPACITY AT LESS COST

The Racine 20 x 20 has a two inch greater capacity at a 31 to 37% investment saving.

Rugged, simple construction with complete, modern hydraulic controls.

A single lever controls all operations.

All parts are easily accessible.

Dual 100% progressive metered Positive and flexible feed

Write for catalog and prices of complete RACINE line, including single purpose, special and fully automatic models, capacities from 6" x 6" to 20" x 20".



CINE HYDRAULICS & MACHINERY, INC.

2070 Albert St., Racine, Wisconsin

For more data circle 353 on Reader Service Card

### news of the industry . . .

made five year award presentations to members of the sales department— Lawrence Elmendorf, Harold Higgins and Esther Weaver. Del Herrick made a five year presentation to Clifford Bauman and George Clement made the five year presentations to Ralph Kamp, Gordon Mueller, Stanley Reid, Nathan Shaw, Wilfred Smith and Charles White.

The real high point of the evening, injecting a note of warm, human interest, was the surprise guest, John A. Ragsdale, co-founder of Ace Drill Bushing Company, who, with Alan Fisher, started the company on its rise to prominence. Mr. Ragsdale was flown here in secret by the plant employees, as a surprise for Mr. Fisher, from his

mountaintop home in Hazard, Kentucky, where he and his wife operate the philanthropic "Open Door Children's Home" dedicated to homeless children of all ages, colors and creeds.

### PROBLEM: To produce 1200 Brass Elbows per hour—

with THIN walls and thin hollow center tube, without chatter or loading up



"We tooled a special 11-station machine, using two stations for radial relieved B&W trepanning cutters, to produce this hydraulic window lift elbow. Cutter on left made first cut, cutter on right, with standard drill in center, finished hollowing out larger end of elbow and drilled center tube. The extremely thin walls presented problems until we used B&W cutters, when production jumped to 1200 per hour. Over a million pieces were run."

Phil Van Eyck, Process Engineer, Essex Brass Corp., Detroit

for prompt quotations send your blueprints or YOUR problems to

### BEW PRECISION PRODUCTS CO.

11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

For more data circle 354 on Reader Service Card

### VINCO ELECTS PRESIDENT

Edward J. Eggart was recently elected president of Vinco Corporation, Detroit, Michigan, producer of inspection equipment for gears and cams, formed wheel dressers, spline gages, precision parts and aviation gears. Mr. Eggart succeeds E. E. Butler, who becomes chairman of the board of directors. Mr. Eggart was also elected a member of the board of directors.

### ANFORD SURFACE GRINDER MODEL MG

For Dry or Wet Grinding!
PRECISION . SPEED . SENSITIVITY

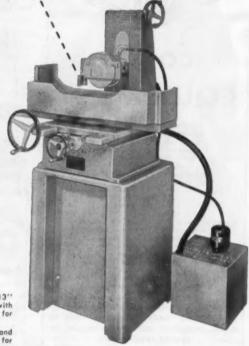
Built by manufacturers who concentrate on small grinders only, each Sanford Grinder is an individual project of time tested and proved basic design. Although modest in price, no quality undermining shortcuts are employed to reduce manufacturing costs. Constant repeat orders prove its acceptance.

This sensitive machine grinds to micro-inch accuracy with no vibration, with maximum dimensional stability. Here's why:

- Transverse ways are double Vee (VV) Mechanite inserts instead of flat surfaces which depend upon unstable jibs for alignment and accuracy.
- Needle, Ball and Oilite Anti-Friction bearings are used throughout. Alignments are electronically checked
- for accuracy. Precision slides are ground, lapped
- and hand spotted.
- Dials are large and legible.

SPECIFICATIONS - 83/4" transverse - 13" longitudinal-12" vertical under 7" wheel with Adapter. Approximate weight 630 lbs. Send for illustrated bulletin.

Replacement parts, special attachments and reconditioning facilities are available. Send for price list.





MANUFACTURING CORP.

1022 Commerce Ave., Union, N. J.

For more data circle 355 on Reader Service Card

news of the industry . . .

### BROWN & SHARPE AND NELCO COMBINE OPERATIONS

Brown & Sharpe Manufacturing Co., Providence, R. I., and the Nelco Tool Co., Inc., Manchester, Conn., have announced combined sales operations to afford American industry on the spot



### COLLET EQUIPMENT

Use-Em-Up Type Drill Sleeves
Use-Em-Up Type Drill Sleeves
Standard Type Drill Sleeves
Standard Type Drill Sleeves
Standard Type Drill Sleeves
Standard Type Brill Sleeves
Short Shank Type Seckets
B. & S. Taper Sleeves
B. & S. Taper to B. & S. Taper Sleeves
B. & S. Taper to B. & S. Taper Sleeves
Standard Taper to B. & S. Taper Sleeves
Rough Shank Sockets
Amorse Taper Shank Tap Sockets
Morse Taper Shank Tap Sockets
Standard Spot Facing Cutter Bars
High Speed Point Lathe Centers
Carbon Steel Lathe Centers
Pipe Centers for Lathes
Lathe Bushings
Blank End Arbors
Chuck Arbors
Chuck Arbors
Drill Drifts
Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

### THE COLLIS COMPANY

Dept. A

delivery of more than 3,000 standard carbide, carbide tipped and high speed steel metal cutting tools and accessories through Brown & Sharpe-Nelco distributors.

Manufacturers may now contact any Brown & Sharpe-Nelco distributor and order more than 2,300 Brown & Sharpe high speed steel metal cutting tools or over 700 Nelco carbide and carbide tipped tools. Stocks will be maintained at every metalworking center assuring "milk route" delivery of standard tools.

The Brown & Sharpe sales organization, combined with Nelco sales-engineers, form a nation-wide carbide tooling service. Brown & Sharpe-Nelco distributors are now able to make specific, non-partisan tooling recommendations and afford faster, more diversified service on a vastly expanded line of standard tools.

In addition to their standard lines, both Brown & Sharpe and Nelco will continue to produce special tools for specific applications where needed.

### \* \* \*

### CINCINNATI SHAPER TO CONSTRUCT ADDITIONAL FACILITIES

The Cincinnati Shaper Company has announced plans for the construction of additional facilities at its Whitewater Shop on Kilby Road in western Hamilton County, Ohio. Construction of this additional manufacturing, administration and engineering building is scheduled for completion early in 1958. It will add approximately 180,000 square feet to the Whitewater Shop. The Cincinnati Shaper Company will then consolidate all of its operations at its Whitewater location.

The Lodge & Shipley Co., Cincinnati, has made an agreement to acquire the Hopple Street real estate of The Cincinnati Shaper Co., early in 1958.

year after year

# **Biggest in Volume Sales**

for tough die sinking!



Reduce Die Costs with



Whether you have new machines or older types in your die and forge shop, you'll be ahead in accuracy and production with T-I Die Sinking Milling Cutters! T-J Cutters are extra sturdy... reduce die costs... preferred everywhere!

Designed for speed, accuracy and long life . . . less breakage . . . more work between grinds! Made from an extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Wide range of styles and sizes. Send for new catalog No. 1055. The Tomkins-Johnson Co., Jackson, Mich.

> TOMKINS-JOHNSON RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHOR

39 Years Experience

For more data circle 357 on Reader Service Card

news of the industry . . .



Wash drawing showing new plant and office building for the Gerotor-May Corporation.

#### GEROTOR-MAY CONSTRUCTS NEW PLANT

Gerotor-May Corp., Baltimore, Md., has begun construction of a new plant and office building on a twenty-six acre site in Owings Mills, Maryland (suburban Baltimore). The one-story build-

ing will comprise approximately 64,000 square feet of space and will be of the most modern design and construction. The entire plant will be operated on an in-line production basis using high-speed, high-production machine tools. Gerotor manufactures a line of hydraulic pumps and motors, variable speed



FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.

For more data circle 358 on Reader Service Card

# new preedom

# IN THE USE OF BEARINGS



"Bunting Bearings" means fine bearings to machinery manufacturers, engineers and mechanical maintenance men. Bunting Cast Bronze is the outstanding metal in the field of general purpose bearing applications. Now the same high standards of manufacturing and distribution are available in a standardized line of Bunting stock sintered powdered plain and flange bearings, thrust bearings and bars.



You can choose the Bunting Bearing that exactly meets your need. Bunting Stock Cast Bronze Bearings and Bars are available in many hundreds of sizes for all mechanical requirements. Bunting stock sintered powdered self-lubricating Bearings are available in a far greater range of standard sizes than ever before. Each embodies traditional Bunting quality.



BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.



# Bunting

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL

The Bunting Bress and Brenze Company · Toledo 1, Ohio · Branches in Principal Cities · Distributors Everywhere
For more data circle 359 on Reader Service Card

# news of the industry . . .

hydraulic transmissions and pneumatic bin evacuators. Occupancy is expected by December, 1956.

## MICHIGAN CHROME AND CHEMICAL ACQUIRES PYRAMID PLASTICS

Michigan Chrome and Chemical Co., Detroit, Mich., has announced the acquisition of the assets of Pyramid Plastics Company of Chicago.

Michigan Chrome, a major manufacturer of vinyl plastisols and specialized industrial coatings, thus acquires the facilities of an established, specialized industrial extruder. The facilities in Chicago will be expanded to manufacture and warehouse Miccro products

For more data circle 360 on Reader Service Card

for better service to the Midwest area. The acquisition of Pyramid adds to the present line of Miccro products a complete line of tapes, tubes, rods, shapes, coatings and specialized products for industrial use. Pyramid products are fabricated from practically all thermoplastic materials such as saran, vinyl chloride and other materials.

Pyramid Plastics will continue operations under the same name with James Palmer continuing as president and general manager.

Announcement was also made of the formation of Michigan Chrome and Chemical Ontario, Ltd., for the manufacture and distribution of Miccroproducts in Canada.

## JONES AND LAMSON TO DEMONSTRATE TAPE-CONTROLLED MACHINES

During September and October at its Springfield, Vermont plant, the Jones & Lamson Machine Company will unveil a new tape-controlled drill press. At the same time, the company will show a new and improved version of the tape-controlled turret lathe and demonstrate the integration possibilities in a shop equipped with more than one kind of programmed machine. The demonstration will produce stock parts of widely differing specifications, but with only punched tapes being changed.



For more data circle 361 on Reader Service Card

Swift... Sharp... Sure...

# Sabre Tooth BAND SAW

# FOR PLYWOOD, NON-FERROUS METALS, PLASTICS, AND WOOD

Here's a band saw blade with hard teeth and a flexible back designed for extra long life and fast, free cutting. Simonds new Sabre Tooth Blade cuts so easily — work practically feeds itself.

Made of tough alloy steel, this specially designed tooth with a hook actually holds a keen cutting edge far longer, gives better service all along the line.

You'll find a Simonds Sabre Tooth does more work at lower cost than your present blade. Try it on your next job and see how it can cut your blade and production costs. All standard sizes in 100' and 250' coils or welded-to-length.

For Fast Service

Call your
SIMONDS
Industrial Supply
DISTRIBUTOR

SIMONDS SAW AND STEEL CO.

Factory Branchos in Boaton, Chicago, San Francisco and Partiand, Oragan Camadian Factory in Montreal, Quo., Simonia Birisions: Simonia Stani Mill, Lockport, N. Y. Hallor Tool Co., Neuroamartows, Ohio, Simonia Abravier Co., Philis., Pac., and Arvida, Quo., Canada

For more data circle 362 on Reader Service Card

# industry news in brief . . .

Hollis H. Mosher named sales representative in Ohio, tool and machine division. Illinois Tool Works, Chicago. Illinois.

Clark R. Hibbard promoted to sales manager, The Fosdick Machine Tool Company, Cincinnati, Ohio.

Joseph P. Chayka appointed chief engineer. Detroit Broach and Machine Company, Rochester, Michigan.

Don Smith has joined the sales staff of the Harry Miller Corporation, Philadelphia, Pennsylvania.

Robert L. Stockus appointed manager-rolling mill sales, Farrel-Birm-

> ingham Company. Inc., Ansonia. Connecticut. He succeeds George F. Schaefer, who has retired.

Upton Bradeen and James, Ltd., 890 Yonge Street, Toronto 5, Ontario, Canada, appointed exclusive distributor in Canada, The Greist Manufacturing Company, New Haven, Conn.

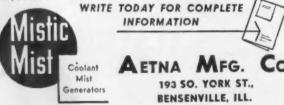
Production Tools, Inc., 559 South Third West, Salt Lake City. Utah, appointed new distributor. Scully-Jones and Company, Chicago, Illinois. Service Industrial, 4118 University Avenue, San Diego, California, appointed new distributor. Pocatello Plumbing and Industrial Supply. Inc., 1921 North Harrison, Pocatello, Idaho: McKee Tool and

# TAPS 6-1/4" HOLES IN A COOL 14 SECONDS! APPED 6000 HOLES JUST AS QUICKLY WITHOUT CHANGING TAP



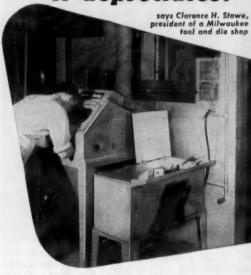
The rings were malleable iron castings. The holes were tapped to a depth of 1/2 inch at 1700 R. P. M.

Hardly seems possible . . . yet this and other equally amazing tooling operations are becoming an everyday occurance in plants equipped with the new Mistic Mist method of cooling tools. Compressing air generates heat . . . expanding air absorbs heat. Add this to the evaporation of moisture and movement of air and you will understand why the application of mist is the most effective, practical and cleanest method of cooling all metal working processes. Mistic Mist is the most economical and efficient mist generating system available . . . requires no special coolant. Systems available for as low as \$30.00.



For more data circle 363 on Reader Service Card

# itself 5 times faster than it depreciates!"





Dollar for dollar, job for job, no other surface conditioning method can equal Liquid Honing.

"Our Liquid Honing machine," Mr. Stowe continues, "enables us to remove heat-treat scale instead of waiting for the heat treater to do it. Consequently, customers get faster job deliveries.

"In only one-fourth usual time, Liquid Honing cleans molds for repairs or remodeling — and ends what used to be a difficult, tedious hand operation.

"Many die casting and plastic molds now go out with an oil-retaining Liquid Honed satin finish that eliminates hand polishing after final heat treating.

"In addition, we clean hand tools, spare machine parts, cutting tools, electrical contacts — anything small enough to go into our machine. So it's easy to understand why Liquid Honing will pay for itself within a year — five times faster than it depreciates!"

That's the Stowe story—a "preview" of a few of many advantages Liquid Honing can bring to your tool room, machine shop or die department. You'll be surprised at the low cost — only \$550 to \$1500 for a standard machine.

Write for details or send a sample part for free demonstration processing.

\*Vapor Blast and Liquid Honing are trademarks.

VAPOR BLAST MFG. CO. 3013 W. Atkinson Ave. Milwaukee 16, Wisconsin



For more data circle 364 on Reader Service Card

# industry news in brief . . .

Supply Company, 925 North Jameson, Lima, Ohio; Peerless Supply Company, Inc., Shreveport, Louisiana; and Kendall Industrial Supply, 407 South Fair Avenue, Benton Harbor, Michigan appointed stocking distributors. Ekedahl Tool and Supply Company, Library Road and Milford

Drive, Pittsburgh, Pennsylvania, appointed distributor.

George C. Beck appointed vice president in charge of advertising and public relations, Ace Drill Bushing Company, Inc., Los Angeles, California. George T. Smith was elevated to vice president in charge of sales. George Clement appointed vice president in charge of manufacturing. Frank M. Fleming named vice president in

charge of personnel and **Del Her**rick named vice president for special assignments.

Eugene Roth, Inc., 129 Court Street. White Plains, New York. appointed sales representatives in Maine. New Hampshire, Vermont. Massachusetts and Connecticut. Diamonite Products Division, United States Ceramic Tile Company, Canton, Ohio.

Ben A. Fleury, Jr., appointed assistant sales manager, The Union Twist Drill Company, Athol, Massachusetts.

Charles B. Martin appointed an abrasive engineer in West Virginia, Norton Company, Worcester, Mass.



# THIS WATER SOLUBLE CUTTING COOLANT STAYS MIXED

FISKE "MAGIC" COMPOUND, when dissolved in water, goes into a permanent emulsion . . . will never separate. It cools, lubricates and produces a high finish. Lengthens tool life. There's nothing so good for milling, drilling, grinding, turning, sawing, threading, wire drawing and stamping. Does not become rancid. Try Fiske "MAGIC" Compound and see the improvement in your work.

Information on each of the many Fiske Lubricating Specialties is available in bulletin form. Send for bulletins describing lubricants of interest to you.



# FISKE BROTHERS REFINING CO.

Newark 5, N. J. and Toledo 5, Ohio

METAL WORKING LUBRICANTS
For more data circle 365 on Reader Service Card

modern machine shop

September, 1956



# ROTARY SWAGING

# produces precision work

Tolerances of ± .001" and better can be produced by Torrington Rotary Swaging Machines—and with an improved, highly burnished finish!

This firing pin was swaged to a tolerance of  $\pm$  .001", compared to a tolerance of  $\pm$  .003" when the part was turned. The switch to swaging eliminated ironing marks which had caused hardened pieces to break. No breakage was encountered after swaging.

Precision work can be performed rapidly with swaging in many different operations including reducing, tapering, pointing, sizing, bonding, forming inside contours or threads.

Send for our informative booklet on Torrington Swaging Machines, or ask to have a technical representative call to show you how you can benefit from rotary swaging.

THE TORRINGTON COMPANY
Swaging Machine Division
730 North Street, Torrington, Conn.

#### Advantages of Rotary Swaging-

- 1 Savings in material—swaging is chipless—shapes the work instead of cutting metal away.
- 2 Savings in labor—swaging can be done by unskilled labor.
- 3 Improved products—swaging improves grain structure, tensile strength, resiliency and finish. Produces work accurate to ± .001" and better.



Write for new catalog—It describes swaging benefits, covers selection of a swager, and gives specifications of Torrington's new streamlined Rotary Swaging Machines. Ask, too, to see our new motion picture on swaging.



TORRINGTON SWAGING MACHINES

Makers of Torrington Needle Bearings

For more data circle 366 on Reader Service Card

September, 1956

modern machine shop

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# industry news in brief . . .

Douglas C. Cunningham has joined Standard Gage Company, Inc., Poughkeepsie, New York, as sales manager.

Aaron E. Wilcox appointed master mechanic, Modern Industrial Engineering Company, Detroit, Michigan. C. A. Pafenbach made vice president in charge of sales, Lavallee and Ide, Chicopee, Massachusetts.

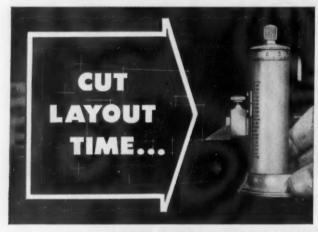
The retirement of A. H. Davis, works manager, The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, was recently announced. Mr. Davis joined the firm in 1935 as assistant works manager. Most of his 39 years of service in the machine tool industry were

spent in supervisory capacities.

George R. Winkley named treasurer and assistant to the president, Thor Power Tool Company, Aurora, Illinois. William E. Sopusek is relinquishing his duties as office manager to become secretary.

John M. Mele, abrasive engineer, formerly in the Cleveland area representing the Bay State Abrasive Products Company, Westboro, Mass., has been transferred to the New York City area.

Miller Industrial Supply Company, 2104 East Locust Street, Decatur, Illinois, appointed distributor, Bay State Tap and Die Company, Mansfield, Massachusetts.



# with GREIST MICRO-HEIGHT® GAGE

Precision-built Micro-Height scribes like a vernier height gage, reads faster than your micrometer! You read direct from zero at base to 3". Hundredths on barrel, thousandths on large-diameter head that cuts reading time! Precision ground and lapped Riser extends range to 9"

## **CUT INSPECTION TIME!**

Add your dial indicator to quickly read distances between holes, surfaces.

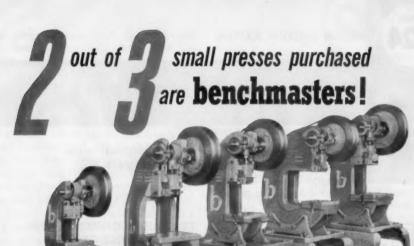
Precision-built, satin-chrome finished Micro-Height Gage quickly pays for itself! Call your distributor or write:



THE **GREIST** MANUFACTURING CO., 499 BLAKE ST., NEW HAVEN 15, CONN.

Precision Products since 1871.

For more data circle 367 on Reader Service Card



That's a fact...out of all small punch presses purchased 2 out of 3 are supplied by Benchmaster!

Being first choice by so wide a margin is no accident. First, Benchmaster builds small presses in 3 distinct capacity ranges...2, 5 and 8 tons. Second, consider the various models available...plain inclinable models, backgeared types, deep throat presses, fixed bed gap frame types, half presses, multiple ram presses and special stroke models!

Add to this the complete range of Benchmaster Accessories... AUTOMATIC DIAL INDEX FEEDS, AUTOMATIC FRICTION ROLL FEEDS, ROLL STRAIGHTENERS, KOIL KRADLES, BARRIER TYPE GUARDS, CHUTE TYPE PRODUCTION PANS, ETC. And remember, Benchmaster's acceptance is world-wide-wherever you go there's a Benchmaster-and Benchmaster service!

When buying new presses choose the winner... First in Sales, First in Quality, First in Economy!

#### Wherever there's a press operation, this Benchmaster Equipment will cut costs, save time!



BENCHMASTER STRAIGHTENERS— (Shown in combination with Koli Kradie.) Adjustable, power driven rolls; removes kinks—straightens out coil stock before feeding to feed mechanisms or to press. Many sizes, write for details.

BENCHMASTER AUTOMATIC FRICTION ROLL FEES—A low cost roll feed made especially for all small presses. Has automatic roll lifters, feeds almost any material. You models: 0.3 and 0.6" cutoff, 3, 5, 7 and 9" roll widths.



matically supplies a stack loop from which any machine can draw. Overcomes inertia of heavy coits—easier loading, Many sizes. Ask for data,



RENCEMBASTER MULTIPLE BAB PRESSES Any number of units required -rems can operate in unison, can alternate or can be staggered ... all stroke lengths can also vary on each stroke lengths can also vary on each bed cut tooling costs, permit quick replacements, Costs ½ to ½ of large presses doing similar work; doubles production!



EINC MISTER DIAL INDEX FEED -Links with ram, automatically indexes, placing new station under ram with each stroke. Up to 6000 strokes per hour. Cuts labor — makes your press operations almost automatic. 12" or 15" diameter tables, up to

FREE BENCHMASTER CATALOG! Write today!

# benchmaster

World's largest manufacturer of small punch presses and mills.

1835 W. Rosecrans Avenue, Gardena, California

For more data circle 368 on Reader Service Card

# new shop equipment

Descriptions of new machines, tools and materials for metalworking.

# Gaging the News...

During the last few months, we have noted two significant trends in the metal-working field; the move to automatic production machinery and the increasing demand for high speed, specialized precision machinery. The problems connected with these trends are closely related.

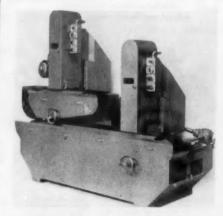
The former trend is important in that industries are facing the terrific problems of high costs of raw materials, soaring labor costs, critical plant space shortages, demands for higher production schedules and because of increased output, the necessity of alleviating operator fatigue. Machinery is now being designed to do the work of two, three or more machines. Hence, the above problems are being met, out of sheer necessity with the introduction of automated machinery. Obviously such machinery requires higher initial capital investment, but the returns come about much faster.

The second trend, the need for specialized precision machinery, is quite remarkable. New machines are needed to cope with the requirements for today's quality standards. For example, aircraft turbine and jet engine parts and components require extremely rigid standards of inspection to keep pace with the aircraft's requirements placed on the finished engines themselves. Conventional machine tools were just simply not built to work in the close tolerances desired.

# TWO-SIDE CONVEYOR-TYPE ABRASIVE BELT GRINDER

For high-speed precision surfacing both sides of flat parts, a new two-level conveyor-type belt grinder has been introduced by Engelberg Huller Co., 107 Seneca St., Syracuse, N. Y. This wetor-dry belt grinder features a dual conveyor arrangement, with turnover hopper device. It is designed to grind both sides of ferrous and non-ferrous metals, plastics, glass, ceramics, and other materials in a single automatic cycle.

Parts are carried under the upper grinding head on a 10½ by 107 inches



Engelberg Huller Abrasive Belt Grinder

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abrasive conveyor belt and automatically turned over in a gravity feed hopper. The lower conveyor belt, 10½ by 206 inches, carries them under the second head for grinding the reverse side.

The two-side belt grinder is particularly adaptable to automatic production lines. Parts can be conveyorized for presentation to the machine's upper conveyor belt, automatically ejected from lower conveyor belt and carried to next operation. The turnover hopper device can be sectionalized for smaller parts.

Speed of conveyor belts with ½ h.p. conveyor drive, is 2 to 25 feet per minute, with higher speed ranges available for special applications. For operator safety, the machine will not start unless the belt is tensioned. Control panels include tension safety light and conveyor reversing switch.

Size of abrasive belts is 10 x 92 inches and belt speed is 5,500 s.f.p.m. The machine is 102 inches long, 42 inches wide and 88 inches high and is equipped with 7½ h.p. drive.

For more data circle 74 on Reader Service Card

#### DUPLEX MILLING MACHINE

From four sides, two pairs of opposed milling heads simultaneously mill the kingpin bosses of forged steel axles. Two surfaces on each end of the front axle are face milled in relation to the frame mounting surfaces. The machine has two tables on each side of the base. The tables are adjustable, so that various angles can be set to mill the surfaces of the part. On each table are mounted opposed (right and left hand) milling heads, each on broad hardened ways. The right hand table is mounted on ways, in order to adjust the distance between the pairs of milling heads. Each milling quill has a 2 inch adjustment, so that an accurate distance between the milling cutters can be set. The fixturing is universal in type, so as to equalize endwise and provide for variance in part design and size. The part is loaded by hoist into the fixture and the operator mechanically equalizes it endwise. Hydraulic clamping is done when the cycle button is pressed. The cycle consists of rapid traverse of the four milling heads to milling position, feed of four heads si-

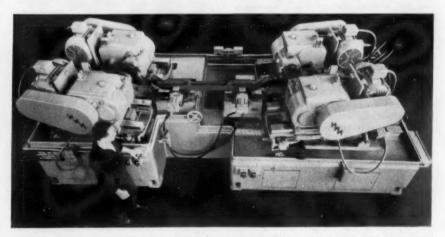


Illustration of Motch & Merryweather Universal-Special Double-Duplex Machine for truck axles

multaneously across the surfaces to be milled, stop and rapid traverse return to the starting position, and the fixture unclamps.

All machine movements are automatic, except for loading and unloading the part. The control and actuation are by hydraulic power. The milling heads are of the universal type, heavy duty, single speed, with provision for speed

changes by change gears.

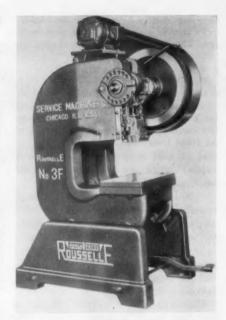
This machine accomplishes a specific task, and yet can be adapted to similar parts by varying the positions of the universal components which hold and machine the work. This machine has been designed and built by The Motch & Merryweather Machinery Co., Machinery Mfg. Division, 888 East 70th St., Cleveland 3, Ohio.

For more data circle 75 on Reader Service Card



## OBI PRESS FEATURES EXTRA THROAT DEPTH

Simply designed and literally stripped for action, the new 3F Rousselle 25 ton press has been introduced by Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. Combining all the versatility of an open back inclinable press with 15 inches of throat clearance (from ram center to frame), it is said to handle a broad range of jobs. The semi-steel frame is heavily reinforced and extremely rugged to provide the necessary rigidity required in a press of this type. Matching the ruggedness of this member are a roller bearing flywheel; extra heavy clutch, which can be set for single stroke or continuous operation; generous bearings that are closely mounted to practically eliminate shaft deflection; and full-length vee-type ram guides, precision ground to maintain true alignment. In build-



View showing Model No. 3F Rousselle Press

ing this press, the manufacturer points out that simplicity has been stressed to facilitate operation and maintenance; also high precision machining is claimed to assure thrifty and uniform presswork.

For more data circle 76 on Reader Service Card



## AIR COUNTERBALANCE SWIVEL ATTACHMENT

A new combination swivel and air counterbalance attachment has been developed by the U. S. Drill Head Co., Burns St., Cincinnati 4, Ohio. This attachment makes it possible to adapt large multiple spindle drill and tapping heads to radial drilling machines. It features built-in safety, not only for the feed mechanism of the radial drill, but also safety for the operator.

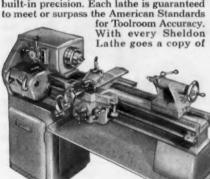
# HELDX

# for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13"... in varying bed lengths with 18" to 48" center distances ... and ... in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units-either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, levershift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed



Sheldon-Built Sebastian 13" and 15" Geored Head Precision Lathes

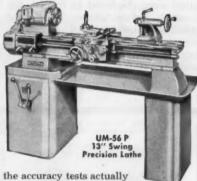


SHELDON

SHELDON Horizontal Milling Machine 12" Shaper

SHELDON MACHINE CO., Inc.

Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes. 4250 North Knox Ave., Chicago 41, III.



performed on that lathe. (19 checks).

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrica-

tion in the headstock and apron with "1-shot" lubrication of carriage.

Send in coupon or write for catalogs and names

of nearest Sheldon and Sebastian Distributors
where you can see these new lathes in operation.

SHELDON MACHINE CO	O., INC. enue, Chicago 41, Illi :ois
Gentlemen: Please send new	catalogs describing:
Sheldon 10", 11' Sebastian 13" and 15' G Herizontal Milling Machine Sheldon 12" Shaper	eared Head Lathes  Name of Local Dealer
Name	Title
Company Name	************************
Street Address	Company Home
City	State

For more data circle 369 on Reader Service Card

Under the old method used to counterbalance large multiple spindle heads. springs were employed to furnish the necessary counterbalance. The old method was inefficient and had definite restrictions, especially when used with relatively deep hole drilling operations. Normally, under the old set-up, tremendous pressures in the counterbalance were set up having dire effects on the feed mechanism of the radial drilling machine and also the operator.

The new attachment insures maximum safety for the operator and better operating economy due to its efficiency and it has more flexibility and ease of adjustment.

Two cylinders are employed which maintain a good, balanced condition of the head on the machine. The air in the counterbalancing set-up is control-

led on both ends of the stroke. Therefore, only sufficient pressure is maintained to counterbalance the weight of the head during all portions of the stroke. On the return stroke, the air is controlled to prevent extreme. quick return of the head which, if not controlled. could endanger the operator. An air filter, pressure regulator and an air oiler are furnished with this attachment.

For more data circle 77 on Reader Service Card



View showing U.S. Drill Head Swivel Air Counterbalance



from your

THE LUFKIN RULE CO.

industrial distributor

Saginaw, Michigan

For more data circle 370 on Reader Service Card

Personal preference and job requirements find the exact model or size desired in the complete line of Lufkin Precision-Built

Micrometers.

228

# VERSATILE

# MILL-M-MATIC for Accurate, Heavy Duty Production Milling . . .



25 H. P. SPINDLE DRIVE

MECHANICAL TABLE FEED

**AUTOMATIC TABLE CYCLES** 

RIGID OVER-ARM

You owe it to your production program to get all the details on this new heavy duty series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of traveling head milling machines.

Copyrighted 1955 by The Motch & Merryweather Machinery Co.



# THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION CLEVELAND 13, OHIO

Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines
For more data circle 371 on Reader Service Card

#### HYDRAULIC-CONTROLLED INTERNAL CONTOURING SLIDE TOOL

A new hydraulic-controlled internal contouring slide tool attachment, designed for fast, accurate internal con-



#### DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS Wilmerding, Pa.

For more data circle 372 on Reader Service Card

# "SEALFLEX"

#### TUBING Leakproof—



Stays in place
For Coolants, Cutting
Oils, Solvents
Made of steel with brass

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in  $V_0 = V_4 =$ 

#### VERMONT FLEXIBLE TUBING CO.

Lyndonville, Vermont

For more data circle 373 on Reader Service Card



View of Warner & Swasey Hydraulic-Controlled Internal Contouring Slide Tool

tour boring of complex shapes as well as large diameter contour turning, has been announced by The Warner & Swasey Co., Cleveland, Ohio.

Engineered for application to 3-A and 4-A extra heavy-duty saddle type turret lathes, the new contouring slide tool mounts, at a 60 degree angle to the spindle centerline, on any one face of the 3-A or 4-A lathe's hexagon turret. The complete tool, with template holder and template attached, indexes with the turret, thus eliminating any interference with other tooling located on adjacent hex turret faces.

Using this new contouring attachment, contours involving curves, tapers, radii and even square shoulders can be



Users report the Multiform Bender one of the handlest tools in the shop. No special tooling . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO  $V_4^{\prime\prime\prime}$  to  $4^{\prime\prime\prime}$  MATERIAL Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M

Kalamazoo, Mich.

For more data circle 374 on Reader Service Card

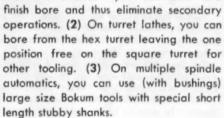
modern machine shop



BOKUM SWING BORING TOOL HOLDERS
FOR BOKUM BORING TOOLS

# Complete Line FOR ALL MACHINES

The added flexibility of new Bokum Swing Boring Tool Holders now can be used on all screw machines, turret lathes and multiple spindle automatics. The newly-designed holders can be used: (1) On screw machines—even the smallest—you can drill and



All sizes of holders have accurate vernier adjustments. They are alloy forgings, heat treated for accuracy and long life. All will accommodate Bokum combined helical and radial backed off boring tools (built in clearances) for long life.



Write today for Supplement No. 1 to Catalog 483-B

BOKUM TOOL CO.

14775 Wildemere Ave., Detroit 38, Mich.

For more data circle 375 on Reader Service Card

machined quickly and accurately, employing only simple, inexpensive tooling, according to the manufacturer. In addition, low setup time enables both small and large lot production to be handled economically.

Actuation of the attachment's tracer

slide is by means of a large, direct-acting hydraulic cylinder. The long piston stroke of this cylinder provides an effective cutter travel of 4 inches, thus permitting the machining of contours having up to an 8 inch diameter variation.

Extremely sensitive tracer slide response is obtained from a differential pressure, closed-circuit hydraulic sys-

> tem regulated by a precision built, microsensitive stylus-controlled valve. The stylus utilizes a flexure-type pivot designed to eliminate wear and lost motion during operation. Unlike conventional pintype hinges, thin strips of spring steel act as the pivot point.

Hydraulic oil for the tracer mechanism is supplied by a separate unit located at the rear of the machine. A full-flow multiple filter system of oversize capacity insures an ample supply of clean, cool oil.

The tracer's template holder and template are mounted and slide on an individual scraped way which is integral with the slide tool base; the template being positioned above and away

# Precisionbuilt for <u>every</u> tool room job



Norton makes wheels for every tool room grinding job — and precision-processes them for precise duplication and the same money-saving "Touch of Gold" performance every time you reorder.

For Sharpening Steel Tools and for surface, cylindrical and internal grinding on all steels, Norton G Bond wheels—in 32 ALUNDUM\* abrasive. 38 ALUNDUM abrasive or 19 ALUNDUM abrasive—have no equal.

For Carbide Grinding, Norton diamond wheels are the "Crown Jewels." In resinoid bonds for wet or dry grinding. For carbide grinding K Bond CRYSTOLON wheels are also economical.

For Cutting-Off, Norton makes wheels, for all wet and dry tool

room applications.

See Your Norton Distributor for aid in wheel selection and helpful booklets. Or write to Norton Company, Worcester 6, Mass. Distributors in all industrial areas. Behr-Manning Company, Troy, N. Y., division of Norton Company. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1734



Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

For more data circle 376 on Reader Service Card



# ABRASIVE SIX EIGhtEEN

# hand feed precision surface grinder!

You're gonna be nuts about this entirely new Abrasive Surface Grinder. Everyone else in your company will, too! The new Abrasive Six Eighteen combines new size (6" x 18") and modern design with new Abrasive-engineered operational features.

Our new illustrated catalog tells all . . . all about Abrasive's effortless anti-friction roller ways; totally enclosed motorized spindle; new, chatter-less cable table drive (successfully tested for over 1,000,000 quick reversals); convenient, waist high table and elevating hand wheels; deep, heavily-ribbed saddle; optional 12" or 7" wheel head; and how you can have the elevating and table hand wheels on either right or left.

# ABRASIVE

Machine Tool Company
East Providence 14, Rhode Island

Yours Free!



ABRASIVE

For more data circle 377 on Reader Service Card

from areas of dirt and cutting-chip accumulation. A standard overhead pilot bar, equipped with a micrometer adjusted bayonet lock, facilitates accurate longitudinal template positioning.

For more data circle 78 on Reader Service Card



For more data circle 378 on Reader Service Card



for more data circle 379 on Reader Service Card

## VARIABLE MAGNETIC POWER CONTROL

An improved portable electro-magnetic drill press has been announced by Buck Manufacturing Co., 103 Roberts Rd., Los Gatos, Calif., which materially reduces drilling, reaming and tapping time and costs.

The new unit, called Bux magnetic drill press Model V-3, features as major improvements, a rheostat control switch for selecting the proper magnetic pull to fit each particular job; a new pilot light assembly that floods the drill point area with light and helps increase operator accuracy; and a new, more compact rectifier unit for converting a.c. to d.c.

The new rheostat switch permits the drill operator to select the amount of magnetic pull he needs for both holding the drill while positioning and aligning and for securely gripping drill to workpiece while he drills, taps or reams. By controlling the magnetic force, the operator can provide enough power to hold his drill to the work so that he does not have to support its weight while aligning, vet still allow enough play so that he can accurately slide the drill point into perfect alignment. Once the drill is positioned, he can turn on full power to hold drill while he works. Because magnetic power holds the drill throughout positioning and drilling operations, operator fatigue is greatly reduced and labor



for rapid slotting OF STANDARD AND SPECIAL SCREWS

#### SEMI-The KENT SCREW SLOTTER AUTOMATIC

Parts are inserted into a revolving disc which carries them past a slotting saw and ejects them into the pan of the machine.

Speeds and feeds are changeable to adapt machine for slotting any kind of metal. Handles all types of heads; also does light milling of similar parts.

Write for illustrated bulletin

The KENT MACHINE CO. Cuyahoga Falis, Ohio Drillare Threaders Slotters Countersinkers **Bar Pointers** 

For more data circle 390 on Reader Service Card



Here is a completely new electric-hydraulic forcing and straightening press, with construction and operating advantages never before offered in a low-cost shop press.

# These are a few of the features:

Rapid Ram Approach

Automatically changes to power stroke when it contacts the work.

Variable Ram Speed From zero to maximum under fingertip control.

Movable Workhead

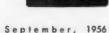
Self-contained—easy to center over the work. Workhead can be purchased separately.

Modern Design

All operating controls at convenient working height.

DAKE These and dozens of other features are fully described and illustrated in new Bulletin No. 347, which we will send promptly on request. PRESSES

Dake Corporation, 612 Seventh St., Grand Haven, Mich. For more data circle 381 on Reader Service Card



# for 2 and 3

# DIMENSIONAL PRECISION ENGRAVING

on steel, plastic and other metals you can be sure when you specify

# PREIS

The PREIS-PANTO line of engraving machines and accessories are precision built and light in

weight but engineered for service by experienced engraving machine specialists who know how to design and build engraving machines.



Model 2D-4 tops for large area engraving.



Model UE for engraving plastics and metals.

Model CG Sturdy Precision Cutter Grinder





Illustrated above is the Model 3D-5 Three Dimensional Engraving and Die Cutting Machine. Features reversible spindle for enlarging or reducing from a model, die or sample.

PANTO

Write for complete literature and prices. For immediate attention write directly to manufacturer below. Ask for nearest representative.

H. P. PREIS ENGRAVING MACHINE CO. 657 U.S. Route 22, Hillside, N. J.

For more data circle 382 on Reader Service Card

new shop equipment . . .



Buck Portable Electro-Magnetic Drill Press

efficiency improved. The new control will provide big savings in set-up time, particularly in awkward horizontal and overhead positions.

Other key features include a new pilot light design, which not only indicates "off" and "on" conditions, but is also so located as to flood the drill point with light, materially increasing operator accuracy. Another time and money saving feature is a new, more compact rectifier arrangement, that makes replacement of this component a simple, quick job.

For more data circle 79 on Reader Service Card



# COUNTERSINK DRIVES SUITABLE FOR AUTOMATION

Two new drives for chamfering, countersinking and counterboring tools, with features that make them especially suitable for automation and multi-



# 13" PRECISION TURRET LATHE



#### HARDENED BED WAYS

Hardened and precision ground bed ways and cross-feed screw can be supplied in lieu of regular at small extra cost.

# SOUTH



The production of small parts requiring both exacting tolerances and high output calls for this new turret lathe. In it has been combined machining speed, handling ease, accuracy and rigidity for producing utmost efficiency on every job.

Its exceptional ranges of facing, turning, ram and threading feeds are a match for every machining condition. Handling is fast and easy as excess weight has been avoided. Time-proven design and careful workmanship give it accuracy for years to come. Send for complete information if you are interested in producing more precision parts at lower costs.

SPECIFICATIONS: Swing 131/8" • Collet capacity 1" • Spindle bore 13/6" • Turret ram effective feed 61/2" • Turning feeds 48 • Facing feeds 48 • Threading feeds 48 • Turret feeds 144 • Spindle speeds 12 • Prices start at \$2,344.

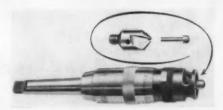
#### SOUTH BEND LATHE

South Bend 22, Indiana

For more data circle 383 on Reader Service Card

ple-spindle use, have been announced by Cogsdill Twist Drill Co., 12980 W. Eight Mile Rd., Oak Park, Mich.

The new drives, called List 340 and List 440 Micro-Limit Drives, differ from previous Cogsdill Micro-Limit Drives in the combination of pre-travel and over-travel features lately added. Depth of chamfer, counter-



View showing Cogsdill Countersink Drive

sink or counterbore can be preset in increments of 0.001 inch sim-

ply by rotating the lower part of the depth-control sleeve by hand. The sleeve, under spring tension, allows 1/4 inch pretravel before the tool engages the part. When the pre-set depth is reached, an overtravel of from 1/4 inch (on the 340 Drive) to % inch (on the 440 Drive) is provided. The combination of pre-travel and over-travel allows for considerable variation in part thickness, positioning and spindle travel without affecting accuracy of the work done. Thrust load is taken on ball bearings through a hardened steel stop collar rotating on needle type bearings.

High speed steel threaded - shank



For more data circle 384 on Reader Service Card

# FLIP THE SWITCH and Automatic Sawing is Yours!





PNEUMATIC BAR FEED Automatically grasps single bar aluminum, brass, copper, magnesium or other non-ferrous metal, moving it exact distance required for cutting.

AUTOMATIC POWER STROKE CUTTING HEAD Up to 1600 cuts per hour with a milled finish that eliminates need for further machining. Tolerances are held to .005" or less. Many runs have already produced tolerances of .001" for 90% of production. Cutting head is engineered with geared-in-head drive (a Stone exclusive) — delivering maximum power at lowest cost. Cuts any desired length, 1/4" to 6 feet, with larger capacities on request. Capacity, 31/2" solids, 5" OD tubing and extrusions.

OIL MIST SPRAY LUBRICATION Saw blade is automatically lubricated with fine oil mist spray to give faster, cleaner cuts. Blade lasts longer and you get more cuts between sharpenings.

A Stone Cut-Off Machine for Every Operation-Whether you're cutting ferrous or non-ferrous metals, in everything from bar to sheets and plate, there is a Stone cut-off machine to meet your exact specifications. Write or call Stone Machinery Co., Inc. for complete details. No cost . . . no obligation.

# STONE MACHINERY COMPANY, INC.

131 Fayette Street, Manlius, New York

". . . represented in every major industry throughout the world"

countersinks with insertable steel pilots in 54 different combinations of included angle and pilot size are available from stock for each of the drives; solidpilot countersinks, special countersinks and counterbores will be provided on special order.

For more data circle 80 on Reader Service Card



LeBland 16 inch Sliding Bed Gap Lathe

more than 50 per cent greater distance between centers.

With bed closed, it functions as a regular engine lathe. This unique versatility is ideal for turning the unpredictable extremes encountered in maintenance and job shop work. The new lathe handles large diameter work, extra long pieces and parts with large projections.

Basic difference in the new lathe is

# SLIDING BED ON NEW LATHE GIVES UNIQUE VERSATILITY

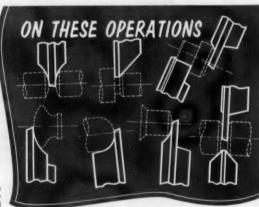
R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio, has designed and marketed a 16 inch sliding bed gap lathe. The lathe, with the bed extended, gives twice normal swing size and

STANDARD circular form tools

# make MORE PROFIT

Now you can save time and money on a wide variety of form tool operations by replacing costly made-to-order or hand ground tools with Somma Standard Circular Form Tools.

In addition you are assured of uniform accurate dimensions every time, easier set-ups, and a better finish on the parts.



And Somma Standard Tools are available through the Somma representative in your area. • Write for new catalog and price list of standard tools and blanks.

OMMA TOOL CO., INC. 20 BROWN STREET, WATERBURY, CONN.

West Coast Warehouse: 576 N. Prairie, Hawthorne, Cal.

For more data circle 386 on Reader Service Card



# High spraying speeds—high deposit efficiencies—simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOSPRAY GUN and the THERMOSPRAY HARD-Facing Alloys, these disadvantages have been overcome.

The Thermospray gun is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The Thermospray Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed *Metco Process*, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



Metallizing Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York Telephone: EDGEWOOD 4-1300

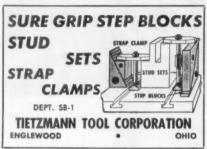
In Great Britain: Metallizing Equipment Co., Ltd. Chobham near Woking, England

The following trade names are the property of Metallizing Engineering Co., Inc.:
METCO\*, ThermoSpray \*Reg. U. S. Pat. Off.

Don A. Watson Metallizing Engineerir.g Co., Inc. 1177 Prospect Ave., Westbury, L. I., N. Y.		
Please send me more information	companystreet	
☐ about the New ThermoSpray Gun		
☐ about ThermoSpray Hard-Facing		
☐ Please arrange a demonstration in my shop.	cityzonestate	
For more data circle 387	on Reader Service Card	

For more data circle 36

its special bed which slides open to form a gap, enabling the lathe to change shape to suit odd-shaped parts. "Swing size" as such is no longer a limitation. For example, the manufacturer reports the following unusual capacities can be turned on the lathe:



For more data circle 388 on Reader Service Card



For more data circle 389 on Reader Service Card

Face 38 inch diameters in one cut. Face 45 inch diameters in two cuts. Turn lengths more than 50 per cent greater than normal center distance. With extension rest (optional): turn 271/2 inch diameter, 131/4 inch length. With full-swing turning attachment (optional): turn 45 inch diameter almost full length of gap.

Other important features of the lathe include new spindle bearing design for high-speed turning, combination gearbelt drive headstock, 18 geared speeds and 9 timing belt-driven speeds from 8 to 2,000 r.p.m., spur gear design, four-way rapid traverse, one-piece apron, totally enclosed quick change box. hardened and ground steel bedways. thrust-lock tailstock.

For more data circle 81 on Reader Service Card

#### NEW HYDRAULIC FEED UNITS

Series 20-400 and 20-401, a new line of standard horizontal and vertical way type hydraulic feed units, has recently been announced by The Hartford Special Machinery Co., 275 Homestead Ave., Hartford 12, Conn., as another item in its complete line of components for Build-Your-Own production machines

These standardized components featuring "balanced thrust" are designed to provide thrust above the ways near the tool load. They allow positive control of rapid traverse, fine feed and

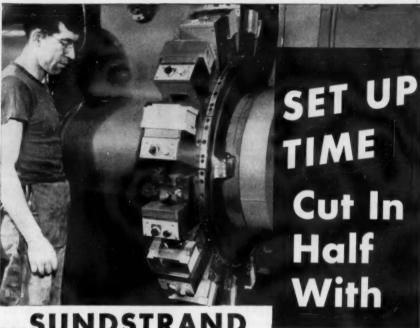


# FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. Hand-indexing: 36" and 50" square or round. Power rotary and power feed: 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI GILBERT MACHINE TOOL COMPANY . CINCINNATI 23, OHIO

For more data circle 390 on Reader Service Card



# SUNDSTRAND MAGNETIC CHUCKS

This drum type rotary milling machine has been provided with Sundstrand magnetic chucks to hold 16 different sizes of bearing caps. Production has been increased approximately 25% and set up time cut in half over former

method of holding.

This is another example of the profitable application of Sundstrand magnetic chucks to existing equipment.

#### ADDITIONAL DATA ....



... is available on many interesting and profitable Sundstrand magnetic clamping fixture applications. Write for your copy today. Ask for Bulletin 571-M.

# SUNDSTRAND Magnetic Products Co.

Division of Sundstrand Machine Tool Co. 1020-9th ST. . ROCKFORD, ILLINOIS

For more data circle 391 on Reader Service Card

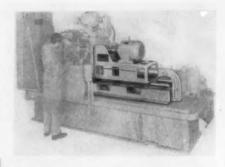
September, 1956

modern machine shop

243

depth. Depth will repeat within 0.0005 inch. The flange is designed to simplify mounting and aligning of multiple spindle heads and the 15 inch stroke is said to assure ample tool change clearance.

In its position above the ways, the power cylinder is more accessible for



Hartford Standard Hydraulic Feed Unit

BIN UNITS
BENCH OF FLOOR

FOR STORAGE

or

ASSEMBLY
OF SMALL PARTS

15

BENCH MODELS

FIVE SIZES
of removable
BIN BOXES

Visible parts handling saves time and money!

FLOOR MODELS DEALERS IN PRINCIPAL CITIES
STANDARDIZED BY AMERICAS LEADING MANUFACTURERS

BATHEY MFG. CO.

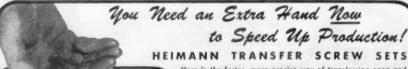
For more data circle 392 on Reader Service Card

maintenance and the hydraulic control panel can be mounted on either side of the unit. A separate floor type power pack supplies the hydraulic power in full compliance with J.I.C. standards. The unit develops a maximum thrust of 12,000 lb.

Feed rate is infinitely variable from 0 to 24 inches per minutes, rapid advance is 8 inches per second and rapid return is 5 inches per second. Rapid advance and feed stroke lengths on the unit are adjustable to suit, by repositioning control dogs.

Multiple spindle drive motors up to 20 h.p. can be mounted on the saddle. Precision hardened and ground ways are standard equipment on this machine. Automatic lubrication of ways is available.

For more data circle 82 on Reader Service Card



IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 393 on Reader Service Card

# Stop tap breakage and scrap

# SCULLY-JONES SAFE-TORQUE DRIVERS

## NOW AVAILABLE IN NEW STYLES AND CAPACITIES



Quick-Change Type

features

Heavy-Duty Safe Torque Tap Drivers · Two sizes: tap range from 1/2 to 11/2 in.; torque 500 to 2400 in. Ib.

These benefits	for these reasons	result from these PREMIUM
PREMIUM	Reduce tap break- age. Control adverse tapping conditions.	One-shot clutch and cam-drive collet completely disengage tap from driver.
LIFE		2. Pre-set torque re- mains constant. Wide range of settings.
PREMIUM QUALITY TAPPED HOLES	Produce uniform, accurate threads.	3. Freewheeling action eliminates impact and objectionable vibration.
	Help prevent use	4. Releases instantly at proper setting.
	of dull or improp- erly sharpened tap, or wrong tap for jeb.	5. Tension and compres- sion type compensates for feed variation be- tween spindle and tap.
PREMIUM PRODUCTION EFFICIENCY	Operator gains confidence, more free time for other work.	6. No noise or impact on release. Tension and com- pression type spring loaded.
	Use higher speeds on all tapping jobs.	7. Operates at any speed taps can take.
	Reduce down- time.	8. Gives dependable control over adverse machining conditions.
		9. Quick-change type —change tools without stopping machine.



OPPORTUNITY

PREMIUM

PROFIT

Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

# PRECISION HOLDING TOOLS

"Precision Holding" for holding precision

Scully-Jones and Company, 1909 South Rockwell St., Chicago 8, III.

Driver has long

service life.

For more data circle 394 on Reader Service Card

10. Freewheeling action

minimizes wear.



Tension and Compression Type • Two sizes: tap range from No. 10 to % in.,

torque 50 to 700 in, lb.

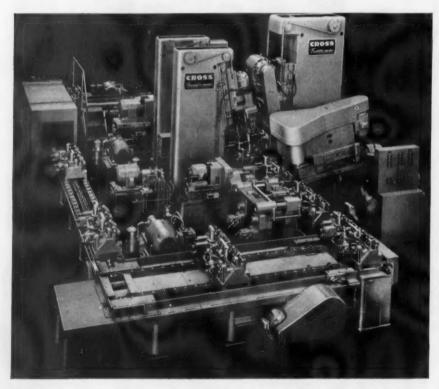
#### SPECIAL TRANSFER TYPE MACHINE FOR AUTOMOTIVE V-8 EXHAUST MANIFOLDS

The Cross Co., Detroit 7, Mich., has announced a new Transfer-matic, which completely machines V-8 exhaust manifolds for one of the big three automobile producers. The machine utilizes six stations to perform 51 operations—eight milling, 37 drilling, chamfering and spotfacing, and six tapping.

Designed for fast and easy mainte-

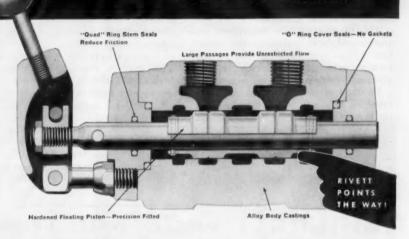
nance, the Transfer-matic was built on the manufacturer's machine tool modularization principles, which utilizes standard parts, components and assemblies. These units, or modular building blocks, facilitate part design changes and provide standard units for convertibility from one configuration to another. A major feature of the machine is the reduction of down-time through the incorporation of preset tooling. This is claimed to eliminate machine adjustments and trial cuts, reduce tool breakage and grinding costs, minimize scrappage of work and equalize the operator's time.

For more data circle 83 on Reader Service Card



Cross Transfer-Matic for Complete Machining of Automotive V-8 Exhaust Manifolds

# No Stick! No Bind!



# with Floating Piston!

Valve Stem Is Independent Of Valve Bore In Rivett Hydraulic Pipe Mounted Valves

#### Features Benefiting Operation -

- "Quad" Ring Stem Seals Reduce Friction
- Large Passages Provide Smooth. **Full Capacity Flow**
- · Simple Design Assures Leakproof Operation
- . Opens And Closes Smoothly, Positively
- Operates Multi-Million Cycles

RIVETT, INCORPORATED . Dept. MMV9 Brighton 35, Boston, Mass.

RITIO

Get Catalog No. 204 to aid circuit design.

#### 1607 Valve Selections!

Hand, foot, cam, solenoid, pilot, flow control, check, deceleration, relief, unloading, sequence, counterbalance.

1/4", 3/0", 1/2", 3/4", 1", 11/4", 11/2" Pipe or panel mounted. 1500 P.S.I.; 3000 P.S.I.



For more data circle 395 on Reader Service Card

#### UNIVERSAL GRINDERS REDESIGNED

With the addition of its new 14 and 18 inch Type U-4 universal grinding machines, Norton Co., Worcester 6, Mass., completed the redesign of its line of universal grinders.

The 14 and 18 inch machines, just announced, have features which assure fast setups and rapid action in performing external, internal and angular grinding operations on large pieces.

In changeovers involving chucking, internal, or dead center grinding, setup is particularly fast because a special feature simplifies the procedure. A chuck can be permanently mounted on the U-4. A 6-inch D-1 cam lock nose on one end of the headstock takes chucks or special fixtures, and the other end is equipped with a dog drive plate for conventional grinding on centers. The change from conventional to chucking grinding only requires swiveling the headstock 180 degrees and chucking the workpiece.

The advantage of permanent chuck mounting combines with that of the hinged-bracket type internal grinding spindle to speed set-ups for internal grinding. The individually powered internal spindle is quickly swung down into grinding position — or is easily swung back to the inoperative position. Time-savings from these advantages plus those from the ability to do an internal and external grind on a workpiece without disturbing the set-up, assure consistently low job costs.

An infinitely adjustable work speed of 60 to 360 r.p.m. produced by mechanical means from an A.C. source, gives ample power throughout the entire work speed range and provides for

# HANCHETT METCALF WHEEL DRESSERS

# **FAST CUTTING ACTION**

Balanced . . . Free Running . . . High Speed Crushing and Wheel Forming Action . . . For SHARP, CLEAN, OPEN WHEEL FACES





MODEL 1943 CC ASSEMBLY

> STEEL CUTTERS For Surface Grinders, etc.

Complete Extra Wheel \$1.50 Assembly \$7.95

Made by the World's Largest Manufacturers of

SAW SHARPENING and KNIFE GRINDING MACHINERY

# HANCHETT MANUFACTURING CO.

BIG RAPIDS, MICH.

MM-112

PORTLAND 1, ORE. .

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Heavy Duty Vertical Milling Attachment

Heavy Duty Offset Vertical Milling Attachment



Universal Milling Attachment



Rack Milling Attachment

Send coupon for FREE Slide Guide and detailed descriptive literature on easy-to-use attachments.

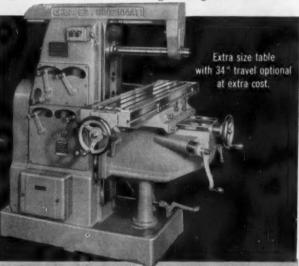
# Heavy duty attachments increase versatility of dependable, low-cost

# GREAVES MILLS

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS.

Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



### GREAVES MACHINE TOOL CO. 2600 Eastern Avenue, Cincinnati 2, Ohio

Send Slide Guide, I will make my own comparison of GREAVES MILLS with other makes. Send information on Attachments and Accessories for GREAVES MILLS.

NAME TITLE

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ADDRESS

CITY ZONE STATE

For more data circle 397 on Reader Service Card

wide job capacity. Speed changes are quickly made by a small hand wheel on the headstock.

Additional versatility is available in the wheel head which has a double swivel, one above and one below the slide ways. This feature permits independent



Norton Redesigned Universal Grinding Machine

### STANDARD MACHINE RACKS

The Standard Steel Specialty Company, a pioneer in the machine rack field, has brought an accuracy and finish to this product that cannot be matched by any other company.

This rack is made from special ma-chinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking machine racks.

### STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

Plants: Beaver Falls, Pa.; Hammond, Ind.

angular settings of grinding wheel position and grinding wheel feed, thus making it possible to set the wheel at any angle and to feed at any angle-an important advantage in many special jobs.

The automatically lubricated wheel spindle is a plain bearing type in which the long bearings enclose practically the entire circumference of the spindle and support over 50 per cent of the spindle body. Heavy cutting, or the finest finishing, may be done at will with this spindle.

A combination lever and hand wheel operated footstock is supplied as standard. In lever operation, the footstock spindle will remain in the retracted position while loading. Pressure lubrication of all ways; electrical controls grouped in an elevated enclosure; ac-

For more data circle 398 on Reader Service Card



without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

> Write for Price and Folder. Representatives Wanted.





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Patented

## do you need . . . VERTICAL MILLING CAPACITY?



You can add vertical milling capacity

by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in visibility. Spindle milling steel

rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power

feed. Write today for full information.

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1600 JUNCTION AVENUE RACINE, WISCONSIN

For more data circle 400 on Reader Service Card

September, 1956

modern machine shop 251

cessible mounting of pumps and motors, and a ramped outlet in the coolant tank are additional features.

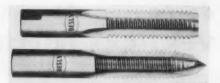
An automatic grinding cycle arrangement and a power wheel head positioning mechanism are available at extra cost.

For more data circle 84 on Reader Service Card



### SERIES OF SHORTER SHANK STUB TAPS

Besly-Welles Corp., 108 S. Dearborn Ave., S. Beloit, Ill., has marketed a new series of shorter shank, time saving stub taps. These shorter length taps eliminate the need for cutting and al-



Besly-Welles Short Shank Stub Taps

tering to fit or the ordering of "specials." The tap fits standard bushings and are available in sizes from No. 0 through 14 and from ¼ through 1 inch. For more data circle 85 on Reader Service Card



### IMPROVED DRILL STOPS

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill., has announced a newly improved line of drill stops for



# MULTIPLE DRILLING with a ...



Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
. . . FITS ANY DRILL PRESS

TI-DRI

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ¾" in steel. Special adaptations available.

COMMANDER MFG. CO.
4224 WEST KINZIE ST. CHICAGO 24, ILL.

Product of Commander — Builder of Production Tools

For more data circle 401 on Reader Service Card

# Maytag switches to STANICOOL HD Soluble Oil... makes two-way saving

- 1 Cost of soluble oil reduced
- 2 Soluble oil consumption cut two-thirds

A check of manufacturing costs on the inner tubs of Maytag's fine automatic washers, disclosed that the cost of soluble oil per unit produced was too high. Standard Oil Lubrication specialist J. I. Nelson, working with plant management suggested a switch to STANICOOL HD Soluble Oil.

The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly each tub was sprayed with soluble oil before processing. With STANICOOL HD, soluble oil consumption was reduced two thirds. And thus, Maytag received part two of its two-way saving.

Perhaps STANICOOL HD Soluble Oil can help you make similar savings. Find out. Call your nearby Standard Oil office in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.





STANDARD OIL COMPANY

(Indiana)

Dwight Norton (right) a Maytag plant foreman inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B.S. degree in engineering from the University of lowa and has completed the Standard Oil Sales Engineering School, Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off for them.



Illustration of Scully-Jones Drill Stop

the positive control of depth of hole. Specifications frequently call for precise control of depth for operations like drilling and reaming on turret lathes. radial drills and other drilling machines. Wherever uniform hole depth is required, the problem is said to be solved easily by the use of these drill stops.

According to the manufacturer, these tools will stop against a fixture bushing or the face of the work with dependable accuracy.

Micrometer adjustment has been added to the drill stops by the combination of a new precision calibrated quick-lock nut and a reference line on the threaded body of the tool. To adjust depth, it is only necessary to loosen the set screw in the quick-lock nut. turn the nut on the threaded shank to the desired position, and then tighten the set screw. Changing tools is equally simple. The set screw in the quicklock nut is loosened and the adjusting sleeve snapped out of the nut by hand. Sliding the adjusting sleeve off the threaded shank exposes the tool for quick changeover. The adjusting sleeve is retained in the quick-lock nut by a spring retainer ring, which is locked in when the set screw is tightened.



### THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

SERVICE MACHINE CO. 2310 West 78th Street . Chicago 20, Ill.

For more data circle 403 on Reader Service Card



### 1/4 H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1½" to 3". %" end mill capacity.

\$24500



### RUSNOK

### 1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3" end mill capacity.
For vertical, horizontal and angular operations.

### 1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
4" end mill capacity.
For vertical, horizontal and angular operations.



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DEALERS IN ALL PRINCIPAL CITIES

MILLING . DRILLING . BORING

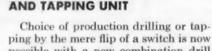
For more data circle 404 on Reader Service Card

Other useful features of the drill stops are chip windows, which prevent packing of chips around the tool, and chip wiping grooves in the stopping face. These tools have been designed with small body diameter to permit operation on close centers and near shoulders or obstructions. The drill stops are made from alloy steel with all wear points hardened for long life. The nose of the adjusting sleeve, or stop collar, is square with its inside diameter for assured accuracy. Standard drill stops in this series are available in eight different sizes to accommodate drils ranging up to 1½ inches in diameter.

For more data circle 86 on Reader Service Card

broken tools made like new again costs on any tool with a Morse Taper (sizes ) Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices-or send tools for repair All work guaranteed. NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION! GUARANTEED We return the us like this! STRONG AS NEW! ICC INC. 1339 Botes Avenue Cincinnati 25, Ohio

For more data circle 435 on Reader Service Card



COMBINATION DRILLING

ping by the mere flip of a switch is now possible with a new combination drill and tap unit recently announced by The Dumore Co., 1302 Seventeenth St., Racine Wisconsin.

Known as the series 28 drill-n-tap, instant changeover from drilling to tapping for long or short production runs is possible without adding a special tapping attachment. Both drill and tap insert directly into the standard 3% inch capacity chuck. This direct tool approach, the manufacturer claims, results in less tool overhang, closer mounting to the work fixture and the use of the same fixture to drill and tap for lower tooling costs.

Changing the direction of tool rota-



JACO DEVICES, INC.

98 High St., Hingham, Mass.

For more data circle 406 on Reader Service Card



For more data circle 407 on Reader Service Card

# A DIVERSIFIED LINE OF QUALITY



Write on your company letterhead for our new Carbide Tool Catalog. Address Dept. F

# JAMON

When the wark calls for carbide cutting tools — tipped or settle—you can count of Union to supply them. The right grade of carbide will have been carefully selected to serve your exact purpose on the meterial you wish to mechanic

Specify Quality Union Tools for a yar cutting needs.

UNION TWIST DRILL COMPANY

MATHOL . MASSACHUSETTS

Outer and Operators of: S. W. CARD COMPANY DIVISION, Manufold, Mass.

BUTTERFIELD DIVISION, Dorby Line, Vermunt and Rock Island, Que.

For more data circle 406 on Reader Service Card



Right-Angle Adaptor
Plate. Complete with Station Selector. For details, ask for Bulletin IT3-B.

WITH RIGHT ANGLE ADAPTOR
1870

JOHNSON & BASSETT INC.
PRODUCTION TOOL DIVISION
WORCESTER. MASSACHUSETTS

For more data circle 409 on Reader Service Card

new shop equipment . . .



Dumore Combination Drilling, Tapping Unit

tion for tapping is done electrically. No clutches are used. With the control set for tapping, the direction of rotation automatically reverses at bottom of stroke to withdraw tap. The manufacturer states the drill-n-tap will produce better, cleaner threads because of the two-way pneumatic system which makes it possible to infinitely adjust both the forward and retract air pressures, to prevent tearing of top threads when pulling tap out of workpiece.

In addition to using standard drills and taps, left-hand drills and taps can also be used on this combination unit. For more data circle 87 on Reader Service Card

### MINIATURE GRINDER

A new high-speed, vane-type grinder, not much larger than an ordinary fountain pen, is being offered by Buckeye Tools Corp., Dayton 1, Ohio, for precision, detailed grinding in toolrooms and on production work. The Mini-Grinder, as this new tool has been named, is only 3¾ inches long, weighs just 3½ ounces. Rated capacity is ½ inch mounted point or grinding wheel; the tool has a ½ inch precision-ground collet.

A rotary valve in the all-steel tool



- ★ MILLS SMALL PARTS MUCH FASTER.
- ★ DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT. Replaces expensive production machinery - or releases it for other jobs.
- ★ INEXPERIENCED HELP CAN OPERATE IT. Safe, simple, fool-proof operation.
- ★ NO MORE COSTLY SET-UP TIME. \$110.00\* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ YOU GET A BETTER PRODUCT—the result of ABSOLUTE ACCURACY.
- ★ A LOSS BECOMES A PROFIT when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- **★ VERY LOW MAINTENANCE.**
- ★ USED REGULARLY IN 1163 MANUFACTURING PLANTS (some of which use as many as 30 machines) — yet on the market a scant few years.
- ★ UNIQUE-VERSATILE. Nothing else like it. One or several machines can be the answer to some of your production problems.

Write today for further information. B. ROUSE & COMPANY 2214 N. WAYNE AVE., CHICAGO 14 50 YEARS OF SERVICE TO INDUSTRY

For more data circle 410 on Reader Service Card

provides infinite speed control from 0 to 50,000 r.p.m. Ball bearing motor mounts assure spindle precision. This miniature grinder is available in a complete kit, with all accessories packaged in a specially designed sturdy tool storage box. Kit includes grinder, 3 nose pieces, 3 mounted points, 2 collet wrenches, dressing stone, 5 feet of air hose and couplings and a fog-type filter-lubricator. A second kit includes similar accessories except the filterlubricator; the tool is also available as a separate unit.

For more data circle 88 on Reader Service Card



### AUTOMATIC PRODUCTION LATHE

A new automatic production lathe has been developed, and is being offer-



Buckeye Miniature Vane-Type Mini-Grinder

ed to the metalworking industry by Reed-Prentice Corp., Worcester 4, Mass., subsidiary of Package Machinery Company.

This particular machine, known as the Reedmatic, is now available in several sizes and combinations of mechanical feeding or hydraulic tracer slides

## People work better when they SEE BETTER®



At Superior Tube Co. - Inspectors use Magni-Focuser to ensure flawless by podermic needle tubing.

MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

NI-FOCUSER

SPEEDS PRODUCTION With Third Dimensional (3-D) Vision Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. Dept. P. New York 17, N. Y.

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Greatest new tool in years for maintenance and production

a high quality, low cost

REVERSIBLE

SPEED REDUCER

Fits all portable drills . . . reduces speed, increases torque seven times. Ask your distributors to show you the . . .

PROFESSIONAL MODEL No. 4000-P

with Yankee-type bit holder











COMPLETE 14-PIECE SET ... ONLY \$24.95

Engineered and manufactured by the makers of

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UP FRONT on America's leading power tools

SUPREME PRODUCTS CORPORATION, 2222 S. CALUMET, CHICAGO, ILLINOIS

For more data circle 412 on Reader Service Card









and can be tooled in a wide variety of arrangements for short run or high production turning, with automation or without automation.

Two models are currently available. The C-30 machine has an 18 inch swing over the carriage ways and 12 inches over the cross slide ways. Its maximum in-put is 30 h.p. The C-60 model swing over the carriage ways is 24 inches and 16 inches over the cross slide ways. Maximum in-put is 60 h.p. Both models can be arranged for chucking or between center work.

The design of these lathes differs from conventional design, as the longitudinal turning slide is mounted to a

rigidly constructed top bed. leaving the entire front of the machine open for unobstructed chip drop. This unique design facilitates loading and unloading, thereby minimizing operator's fatigue and greatly simplifying adaptation to automation. Quadruple pickoff gear arrangement in the heavyduty headstock makes possible an unusually wide range of spindle speed changes. The helical headstock gears are heat-treated and all gears and pinions are shaved in order to assure smooth, quiet performance.

With clockwise spindle rotation, thrust of the turning tools is down and toward the top bed; it is likewise downward on the rear slide, eliminating any



tendency to chatter is fully ab-

MANUFACTURING CO.

For more data circle 413 on Reader Service Card

sorbed. No loss of grinding cen-

ROCKTON, ILLINOIS

ters as the hollow shank per-

mits whole reamer to be set

in as far as necessary.

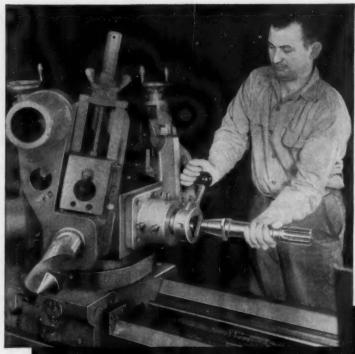
Available with standard or tapezed shank.

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Write for

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complete details



# UNLIMITED Turret Stations... FOR MULTIPLE OPERATIONS

A P.D.Q. (Portage Double Quick) Holder and Tool Adapter in one or more stations means an extra turret station or unlimited stations . . . depending on the number of operations. Just a slight turn of the lock nut releases the holder and you're set for a new tool and new operation . . . all in a matter of seconds. The new P.D.Q. method of tooling can cut costs to a fraction of former out-dated methods. Send for literature concerning complete information on THE NEWEST AND MOST MODERN TOOLING ADVANCEMENT IN INDUSTRY.





Representatives in Principal Cities



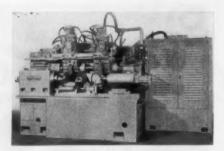
PORTAGE Double-Quick TOOL CO.

1041 SWEITZER AVENUE . AKRON 11, OHIO

For more data circle 414 on Reader Service Card

lifting action on the turning or facing slides, and also provides for the elimination of upside-down tools.

Dry disc type clutch and brake are mounted on the main shaft. The clutch is hydraulically operated and requires no adjustment. Headstock is automati-



Reed-Prentice Automatic Production Lathe

### IIG BORING

and

**Large Precision Machining** 

Done to your specifications

We Have 21 Jig Borers

KIDDE PRECISION TOOL CORP.

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For more data circle 415 on Reader Service Card

TRUE POINT DRILL SHARPENER

for Drills 41 - 60 and 61 - 80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and full details.

UP-TO-DATE TOOL CO.

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 416 on Reader Service Card

cally lubricated by means of a pump, driven from an intermediate shaft, thereby providing lubrication the moment the spindle of the lathe is in motion.

The lathes are arranged for either mechanical or hydraulic feeds to the turning and facing slides. In the mechanical feed machine, the slides are motivated by anti-friction, anti-backlash ball screw and nut. The ball screw, powered by the spindle rotation, assures smooth metered feed. When tracer application is employed, the carriages are motivated hydraulically and the tracer and feed control is employed. This tracer, mounted 90 degrees from center line of spindle, permits mounting of multiple tracing slides to operate independently or simultaneously, and of great importance is the fact that the tracer controlled slide can feed transversely as well as longitudi-

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### **Punches & Dies**

### mean savings for you.

For years we have been following a systematic plan of increasing our stocks of standard punches and dies that benefits you two ways:

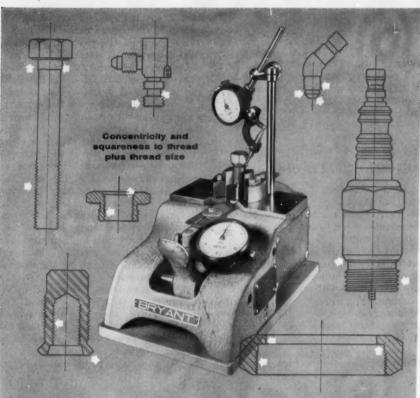
- (1) The punches and dies you need are ready and waiting for you when you need them.
- (2) Because standards are made in large quantities, prices are surprisingly low—quality of the highest.
  68 years of experience goes into every Lewthwaite tool

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T. H. LEWTHWAITE MACHINE CO.

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### You can check all these with a Bryant Gage!

These are just a few of the checking problems that Bryant

Gages can solve — accurately and quickly. For a prompt solution to your checking problem, mail the coupon below.

Bryant Gage and Spindle Division	P. O. Box 620-D	Springfield, Vermont, U.S.A.
Gentlemen:		
Name	Street	

Firm\_\_\_\_\_\_State

For more data circle 418 on Reader Service Card

nally. Thus, with a continuous cycle, can generate fillets and face shoulders with extreme accuracy, consequently reducing the stock removal in subsequent grinding operations.

For more data circle 89 on Reader Service Card



### **AUTOMATIC PRESS UNLOADERS**

Sesco Inc., 8881 Central Ave., Detroit 4, Mich., has expanded its line to include automatic press unloaders, sometimes referred to, in the trade, as "Iron Hands."

According to the manufacturer, these automatic press unloaders will increase production, by utilizing the full capacity of presses; will provide savings in the unloading operations; will improve safety conditions, by reducing unloading accidents; and will reduce production costs.

Each unloader is a fully, self-contained, automatic machine, except for

the limit switch, being mounted on the press. No floor structure is required with these units, thereby giving a much greater amount of working floor area.

The press unloader is synchronized with the press, through a limit switch, and is operated by two air cylinders; a main cylinder, or lift cylinder; and. a jaw cylinder for opening and closing the jaws. Operating cycle is simplified. When the press signals that it is clear for unloading, the jaw cylinder moves the open jaw forward. At the end of the forward stroke, the jaw grips the part. At this point the main cylinder retracts, lifts the stamping out of the die and swings it clear of the press. The jaw cylinder then retracts, unclamps the part on a table or conveyor and trips a limit switch. The main cylinder then returns to its normal waiting position.

All limit switches, valves and cylinders conform to J.I.C. standards. The manufacturer offers a warranty with every unloader, which guarantees the equipment to be free of mechanical or design defects.

The automatic press unloaders are

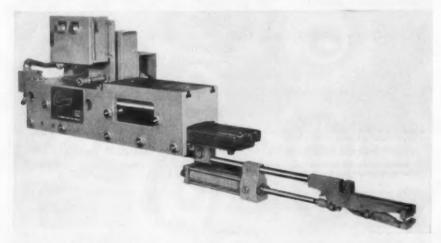


Illustration showing overall view of new Sesco Automatic Type Press Unloader

# NOW... Wider Selection of Armco Stainless Bar and Wire

Newly expanded production facilities give you a wider selection of Armco Stainless Steel bar and wire—give you more to choose from three ways:

- 1. Larger stocks
- 2. Greater lengths
- 3. Wider range of shapes and sizes

Delivery is faster too, with more than 50 standard and special Armco Stainless bar and wire grades available.

### **Consistent quality**

You cut down on costly rejects because high quality Armco Stainless Steels machine uniformly, shipment after shipment.

For complete information about Armco Stainless Steel bar and wire, fill in the coupon or call the Armco Sales Office near you. If you need immediate delivery, just phone your nearby Armco Stainless Bar and Wire Distributor.

	ATION, 1756 Curtis Street, Middletown, Ohio nation on Armco Stainless Steel Bar and Wire.
We manufacture	
Name	
Firm	
Street	
City	ZoneState

### ARMCO STEEL CORPORATION

1756 CURTIS STREET, MIDDLETOWN, OHIO



Sheffield Steel Division . Armos Drainage & Metal Products, Inc. . The Armos International Corporation

For more data circle 419 on Reader Service Card

available in 5 standard sizes to meet most unloading conditions. Jaw widths are adjustable for different width parts. Jaws are adjustable for different loading heights and for the angle of travel into the die. Parts can be swung out any distance desired depending upon the method of mounting and the length of the arm. All adjustments can be made quickly and easily.

The press unloader unit shown in the accompanying illustration has a main cylinder stroke of 12 inches. Through a double rack and pinion, this stroke is doubled, resulting in a 14 inch traverse. The iron jaw cylinder has a stroke of 8 inches, and clamps the part by a mechanical cam, actuated at the extended position of the piston rod.

For more data circle 90 on Reader Service Card



MUSKEGON HEIGHTS MICHIGAN

## HYDRAULIC PUNCHES ADDED TO LINE

A new addition to the line of the W. A. Whitney Mfg. Co., 636 Race St., Rockford, Ill., has been announced recently.

The machine, a hydraulic punch, can be obtained in either a cabinet model known as the No. 95A Hydraulic Punch or an unenclosed type known as the No. 95B Hydraulic Bench Punch. Both types are rated 12½ ton capacity, 20 strokes per minute and are capable of punching 5% inch hole through ½ inch iron, ¾ inch hole through 3/16 inch iron or 2 inch hole through ½ inch iron.

Except for the cabinet which encloses the 1½ h.p. motor and pump in



## HAUSER Die Handler

For tool rooms, inspection, press and tryout departments.

Mobile or stationary. 180 degrees rotation of punch. Locks in any position. 24" x 40" base table. Ball

bearing construction.

Dealer inquiries invited.

WRITE FOR DETAILS

\$987 F.O.B.

HAUSER MFG. CO. POCHESTER 14, N. Y.

For more data circle 421 on Reader Service Card

For more data circle 420 on Reader Service Card

# Abrasive Cutting the best way to cut many materials the only way to cut some

# **Campbell Cut-Off Machines**



 Cutting 20-foot tubes of stainless steel into 1" to 17" lengths

Let us send you this book



### Slice \$32,000 a year from tube cutting costs

Because CAMPBELL Abrasive Cut-Off Machines not only cut stainless steel tubes twice as fast as former methods-but the clean cut saves a de-burring process-Ryan Aeronautical Company saved \$32,000 the first year of operation.

The smooth-finish cut of the CAMPBELL Oscillating Wet Abrasive Cut-Off Machine is extremely accurate—with no hard spots. no change in metallurgical characteristics. It results from the WET cut with abundant coolant supplied just where it will do the most good. Speed and economy come from the oscillation of the abrasive wheel . . . the right one for the job.

### How to get expert advice on your cutting problems

• CAMPBELL Engineering Service costs vou nothing-can save you much. Does your metal cutting problem involve cutting of alloy or high-carbon steel? Our Field Engineers are abrasive-cutting specialists. They can help you arrive at the right combination of a CAMPBELL Cut-Off Machine and ALLISON Cutting Wheel to improve your operation and save you money.



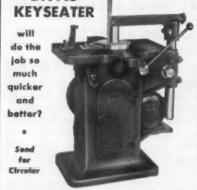
### **Campbell Machine Division AMERICAN CHAIN & CABLE**

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 422 on Reader Service Card

# Why Use A Shaper

to cut Keyways when a DAVIS

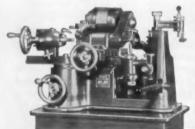


### DAVIS KEYSEATER CO.

Exchange and Glasgow Sts. ROCHESTER, N. Y.

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Sharpens Chamfers, Flutes and Spiral Points



MODEL 1100

· Capacities No. O Machine Screw to 11/2" Hand Taps.

### HENRY P. BOGGIS &

708 E. 163rd St., Cleveland 10, Ohio

For more data circle 424 on Reader Service Card

new shop equipment . . .



View of Whitney Model 95B Punch

the No. 95A Punch, the tools are identical, and can be obtained with either 110-220 volt single phase or 220-440 volt three phase motor. The tool is operated from a foot treadle at the front of the machine and the operator has complete control over the descent of the punch at all times.

Both models have a 10 inch depth of throat, depth gauge at the punch line, and punches and dies can be had in rounds, squares, ovals, rectangular, or in special shapes.

For more data circle 91 on Reader Service Card



### COMPLETE LINE OF INDUSTRIAL TOWELS

A complete line of paper towels, specifically designed to fit all three of the towel dispensers commonly found in company washrooms, has been placed on the market by Scott Paper Co., Dept. MM, Chester, Pa.

This towel line offers many advantages both for management and for employees. These include quality control, economy, proper absorbency, correct size, adequate stretch, wet strength, and no odor or lint. A major factor in

# **NOW BETTER GROUND FINISHES!**

with J&S guaranteed\* self-adjusting



SIMPLE DESIGN:

GUARANIEED 2000 HOURS OR I TEAR

Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

### AUTOMATICALLY ADJUSTS FOR WEAR:

End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

### ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:

Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.

MORSE	JARNO	8 & 5	NORTON	LANDIS
2 to 7	6 to 20	7 to 18	10 to 24	.8125 1.3350 1.7500

#### FOR INFORMATION

See your industrial distributor or write for free literature.



MANY CLAMPS + PROCISION VISES + BOWN-HOLDING BRVICES

CLAMPCUT

J & S TOOL CO., INC.

871 DORSA AVE. LIVINGSTON, NEW JERSEY

For more data circle 425 on Reader Service Card

providing this new line is the effect it will have on improving employee relations, according to the company.

The new singlefold towel, for example, measures 10 by 10½ inches and the new multifold towel is 9¾ inches in size. Each of these new products is put in a 250 towel package, with 15

packages per case. The familiar Scot-Tissue C-Fold towel measures 10 7/16 inches x 14 inches in size and is packaged in a 150 towel carton, with 25 cartons per case.

Softness and whiteness are two important advantages offered by these new singlefold and multifold towels. They will also keep their strength when wet and will stretch to fit the countours of the hands. These products

are also completely odorless and they will not lint even when used on the toughest of beards. Quality control has been assured because towel stock from every roll of paper has been tested in the laboratory before being run on the machines. It has been analyzed and checked against pre-established standards in order to obtain the same maximum performance in every sheet.



Here's the newest in the Wells quality line of metal cutting band saws—The Model 1000, a 10" capacity production machine powered by a 34 H.P. motor. It offers the structural rigidity necessary for better cutting and operation and utilizes a 1" blade to further assure accuracy and efficiency.

The Model 1000 also features the exclusive Wells "constant load" blade tensioning device, four selective speeds, hydraulic frame check and optional

wet cutting system.

See your Wells Distributor, or write for full details.



The Pioneers of Horizontal

METAL CUTTING BAND SAWS

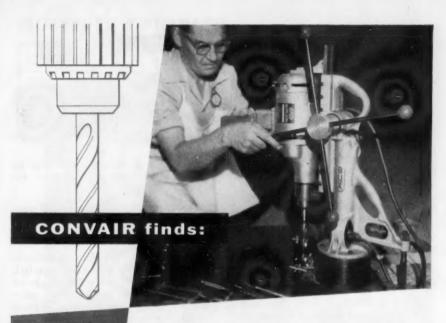
WELLS MANUFACTURING CORP.

808 Tyler Street • Three Rivers, Mich.

For more data circle 426 on Reader Service Card



Scott Paper Towels for industrial use



### "Bux Magnetic Drill Press saves us 28 man-hours daily!"

Read what Convair's Experimental Factory Superintendent J. N. McPheeters says about the performance of a Bux portable magnetic drill press:

"We drill critically-spaced 1 inch holes in heavy 12 foot "I" beams. With our Bux Model L-3, we replace a large radial drill, and eliminate 24 man-hours of set-up time a day! Besides cutting set-up time, we also save 4 more man-hours by not having to tie up a fork lift to haul the beams to the radial drill. And by using our Bux for drilling vertical surfaces, one man now does the work formerly done by two!"

Convair's experience is like that of thousands of other Bux users—work done faster, more conveniently, at less cost. Why not let your local Bux dealer give you a money saving demonstration? Or write us for complete catalog and specifications.



BUCK MFG. CO.
100 Roberts Rd., Los Gatos, California

For more data circle 427 on Reader Service Card

The singlefold and multifold towel will both absorb water quickly enough to satisfy the most discriminating user without turning to mush in the hands. The importance of this absorbency, insofar as management is concerned, will usually show in lower towel consumption and lower overall costs. The use of even one less towel per day by each employee will add up to substantial savings over a year's time.

For more data circle 92 on Reader Service Card



View of Pratt & Whitney X-Ray Gage for precision measurement of aluminum foil

devised a continuous process of controlling the thickness of aluminum foil by the use of a Pratt & Whitney X-ray gage.

In tackling the problem of the continuous measurement of aluminum foil, the company has taken advantage of the X-ray's ability to detect the presence of metal while ignoring organic materials which are essential in solu-

### \* \* \*

### PRECISION MEASUREMENT OF ALUMINUM FOIL

Pratt & Whitney, Inc., 25 Charter Oak Blvd., West Hartford 1, Conn., has

MARVECO LIVE CENTERS are designed to handle any load.

MARVECO LIVE CENTERS are the MOST ACCURATE live centers made.

MARVECO runout total indicator reading is LESS THAN .0001".

MARVECO is guaranteed to outperform, outlast any other LIVE CENTER.

ASK YOUR DISTRIBUTOR OR WRITE

MARVEL TOOL & MACHINE CO.

1092 NO. RIVER ROAD

ST. CLAIR, MICH.

For more data circle 428 on Reader Service Card

### MULTIPLE SPINDLES.

Illustration shows Twin Spindle Gorton Duplicator profiling 15 blades on two impeller rings of stainless steel alloy from a sinale blade master.

# CUT COSTS! SAVE T



### Multiple Milling Heads Multiply Output!

Gorton Twin Spindle Duplicators - manually controlled (shown above) or up to 6 Spindles hydraulically controlled, boost individual machine productivity.

A wide range of spindle speeds—up to 12,000 R.P.M. . . . for either high speed steel or carbide cutters. Gorton Super-Speed Vertical Mills and Duplicators are ideal for vertical milling, inside or outside profiling, die sinking, mold cutting, counterboring, chamfer-

ing, grooving and for general duplicating in ferrous and non-ferrous metals as well as plastics. Work pieces may be flat, cylindrical, spherical, square, uniformly curved or irregular in shape. Standard models or custom designed - Gorton Tracer controlled Duplicators fill many present day needs for more production at lower costs.

### SPINDLE SPEEDS UP TO 12,000 R.P.M.

- 10 Models Super-Speed Vertical Mills
- 7 Models quickly convertible for Duplicating
- or Milling.
   Horsepower from 1/2 to 15.

Gorton offers to supervisors and department heads a full-color and sound 16mm film tion", showing Multiple Spindle Milling applica-Write tions. Write for plete information. com-



Write for condensed General catalog 1655-1709—no obligation.



### GEORGE GORTON MACHINE CO.

1709 RACINE STREET . RACINE, WIS.

Tracer-Controlled Pantographs, Duplicators—standard and special...Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 429 on Reader Service Card

A 8894-1PA



### PRODUCTION SOLDERING

Handles numerous soldering jobs from fine precision to medium-heavy industrial. More than 16 styles of electrode holders to fit individual soft or hard soldering operations.

From 6 to 30 stages of heat with a selector switch used in conjunction

with 3 secondary terminals.

A wide range of power—5 to 2500 watts—quickly supplies concentrated heat at exact area—insures perfectly soldered joints with maximum Speed, Safety, Flexibility and Economy.



### ETCHING & DEMAGNETIZING

Marks the hardest steel, stainless steel, steel alloys or carbides with the ease and legibility of a pencil. 4 types of interchangeable marking points available to serve every purpose. 6 to 36 distinct marking heats. Easy to operate. Two tools in one. Demagnetizes over a 4 to

8-inch width. Especially valuable when tools have been in contact with magnetic chuck

Write for New Catalog descriptive of all model Solder Tools, Etchtools, Demagnetizers . . . today.



P.O. Box 132-M5 • Toledo, Ohio For more data circle 430 on Reader Service Card

### new shop equipment . . .

tion during the actual process of alu-

The gage is calibrated for a range of from 0 to 0.015 inch of aluminum, permitting direct setting as well as direct readings to 0.00001 inch—or 10 millionths of an inch. Precision of this magnitude had previously been possible only by the slow process of accurately weighing a sample of known area.

With this process check, automatic thickness control is practical, efficient and fast. The company also makes available, as a part of a complete control system, a direct reading recorder that records actual material thickness regardless of gage setting.

The X-Ray Gage is made up of three basic units: the gage head, which is completely sealed and purged with nitrogen; an electronic cabinet containing the power supply, amplifier and operator's panel; and a line voltage stabilizer. The gage head illustrated has a 4 inch gap and 24 inch throat; other configurations have been designed to meet special conditions. The operator's panel may be removed from the cabinet and installed at a more remote point, if desired.

The same basic X-ray gage can be used for steel and all other metals made in strip form and for different thickness ranges. Various control units add other functions to the versatility of these devices. These include screwdown, tension, classifying, and production analysis controls.

For more data circle 93 on Reader Service Card



### TOOLING TECHNIQUE

Crane Packing Co., Dept. MSC, 6400 Oakton St., Morton Grove, Ill., has announced that flat lapping of shoulder

# pers Cut Costs

RUBBER STRIPPER



Stripping with R-B rubber strippers or R-B rubber covered spring strippers eliminates costly metal strippers. Both types of R-B strippers serve the same purpose—rubber strippers are used with smallor punches having shank diameters up to and including %; rubber covered spring strippers are recommended for punch shank diameters larger than 1/4". Use R-B strippers—to save the cost of making strippers—to substantially reduce installation time—for reduced maintenance.

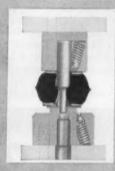
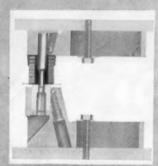


Illustration above shows rubber stripper on punch shank. In this type of application #-8 strippers are held to punch shank by friction.

RUBBER COVERED SPRING STRIPPER



To the right is a cross section illustration showing how rubber covered spring strippers (else rubber strippers) are used with R-B Flex-Mount retainers.



No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff.

Use R-B Engineering Service for Your Piercing Problems



RICHARD BROTHERS PUNCH DIVISION ALLIED PRODUCTS CORPORATION

76486 CAPTTOL AVENUE . DETROIT 39, MICHIGAN

For more data circle 431 on Reader Service Card

faces, as well as other lapping, can now be done with a new Lapmaster tooling arrangement that consists of a 12-inch grooved lap plate mounted in the center of a 24-inch lap plate. This permits the lapping of shoulder faces, such as the aviation fuel pump parts illustrated. The 12-inch lap plate can then be removed to permit lapping of other workpieces on the standard Lapmaster. This tooling effects a considerable savings, since it eliminates the cost of purchasing a complete machine for this type of lapping.

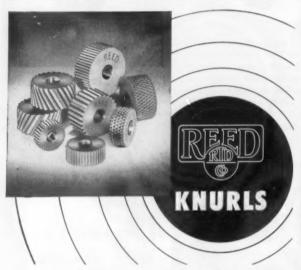
The new tooling arrangement is equally adapted to many other parts where precision finish and flatness are required. These include valve bodies

and discs such as those used on diesel locomotives. Valve bodies of this type have a protruding stud. Thus, the 12-inch lap plate can be used for the valve body with the stud, while the 24inch lap plate with conditioning rings is used for compressor discs and other flat parts.

This tooling arrangement can also be supplied to fit the new 36inch model Lapmaster. These machines are used to



View showing application of Lapmaster **Tooling Arrangement** 



The lapped finish on the hard knurling surface of the knurl contributes to outstanding performance and longer life.

> Over 100 styles and sizes in stock. Special knurls to your specifications.

# REED ROLLED THREAD DIE

Thread Rolling Machines and Dies, Thread Rolling Attachments, Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes WORCESTER, MASSACHUSETTS, U. S. A.

For more data circle 432 on Reader Service Card

# HAMIKLEER

\*REG. U.S. PAT. OFF.

Rated Best TESTED!

DILUTION:

### THE TEST

A metalworking firm, well known for precision work and outstanding technical skill, tested 30 different brands of coolants. They wanted one coolant that would give excellent performance on grinding, threading, boring, turning and honing operations on cast iron and hard and soft steels.

At the end of the test, which was one year, HAMIKLEER was rated best by a wide margin, outperforming all others even in hot, humid summer weather. It is now the standard all-purpose coolant for the company.

HAMIKLEER is an odorless synthetic, clear liquid... without ails of any kind. It replaces soluble ails, dissolves in any kind of water to make a clear, thin, odorless, rancid-proof lubricant and it will not foam, decompose, gum or become tacky. Here's what this product will mean to you:

### ONE COOLANT TO REPLACE MANY DIFFERENT PRODUCTS

HAMIKLEER can be used for practically any metal cutting and grinding operation—on cast iron, hard and soft steels. It even replaces kerosene for honing and eliminates the fire hazard.

FINE SURFACE FINISH . . . LONGER TOOL LIFE HAMIKLEER keeps work cool, clean and plainly visible at all times. And, because of its excellent lubricity and anti-weld properties, it assures fine surface finish and increased tool life.



There were no signs of rest or rencidity when HAMIKLEER was used on many metalworking operations even during hot, humid weather.

#### RUST PREVENTION

The one year test—and other tests—prove that HAMIKLEER protects metal from rust even in hot, humid weather. In addition, it does not turn rancid.

### NO DISPOSAL PROBLEM

HAMIKLEER can be run down drains without danger of gumming or clagging, providing oils do not get into the mixture.

TEST HAMIKLEER on your own metalworking operations at our expense. Send for a free sample today.



### HARRY MILLER CORP.

Original Products and Processes Since 1936

4th and BRISTOL STS. . PHILADELPHIA 40, PA.

Service Representatives in Principal Cities

For more data circle 433 on Reader Service Card

generate surface flatness to less than one light band and finishes to 2 r.p.m. in short or large production runs. Typical applications are parts for engines, transmissions, adding machines, tool and die equipment and quartz and germanium crystals.

For more data circle 94 on Reader Service Card



### NEWLY DEVELOPED LIQUID SPRINGS

Taylor Devices, Inc., 188 Main St., N. Tonawanda, N. Y., has developed a new series of liquid springs. These springs accomplish the work of ten springs—ten times the force in the same space, according to the manufacturer.

Taylor Liquid Springs are designed for concentrated high force require-



Taylor Tension - Compression Liquid Spring

ments in dies, machines and other applications where space or weight is a problem. They also may be used with coil springs as they are built to the same dimensions and strokes with greater force.

According to the manufacturer, these springs often eliminate separate mechanical dies or linkages by providing preloads capable of doing work or operations, after which the spring force can be overcome while performing subsequent or simultaneous operations. These devices can also be combined



### D E A R B O R N Automatic Chucking and Indexing Fixture

FEATURES:

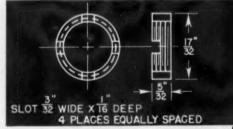
- 1. Work held by collets
- 2. Automatic opening and closing
- 3. Work automatically ejected
- 4. Automatic indexing if required
- Three models with capacities from 1/32" to 2".

J. W. DEARBORN

# 1200 PIECES

PER HOUR

This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.

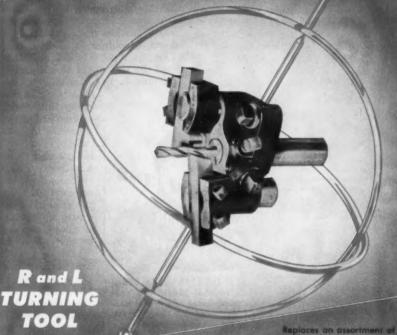


Write for illustrated data. Send blueprints or specifications of work.



For more data circle 434 on Reader Service Card





fourteen different tools . . . changes from

right to left in ten seconds . . . no misalignment . . .
extremely fine adjustment provided . . . for rough and
heavy cuts as well as finishing cuts . . . The R and L TURNING TOOL
is constructed with best possible care and of finest steel.

Write for Catalog



TURNING TOOL - CARBIDE OR ROLLER BACKRESTS - RELEASING ON MON-RELEASING TAP AND DIE HOLDERS, (ALSO FURNISHED FOR ACORN DIES) - UNIVERSAL TOOL POST - TURRET BACKREST HOLDER - CUT-OFF BLADE HOLDER - RECESSING TOOL - REVOLVING STOCK STOP - FLOATING DRILL HOLDER - KNURLING TOOL

For more data circle 435 on Reader Service Card

with structures to eliminate costly parts while still performing the spring function; for example, as a connecting rod in a reciprocating machine and as a stud spring plunger and holding member for a metalworking die.

For more data circle 95 on Reader Service Card

## DUST AND VAPOR CONTROL UNIT

A compact unit that captures fog, smog and mist from surface, cylindrical and thread grinders, lathes, screw machines, and other machine tools using cutting oils has been developed by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich.

Named the Hammond MistKolector, the machine is being offered in two

models and in four motor sizes, with volume ranging from 525 to 2.685 cubic feet per minute and motor h.p. from 1/2 to 5. Because of its compact design. the machine requires a minimum of floor space and can either be "tucked in" around the machine served or suspended from the ceiling if floor space does not permit floor installation. In addition, the flat top can be used for work or storage. Filter needs re-



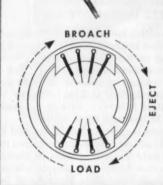
# GREEN INSTRUMENT COMPANY 373 Putnam Ave., Cambridge, Mass.

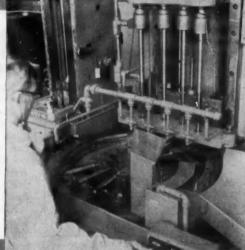
For more data circle 436 on Reader Service Card



**Hammond MistKolector** 

### RADIAL FIXTURE DESIGN





# contributes to HIGH OUTPUT BROACHING the American way

While this American vertical pull-down broaching machine is broaching the inside diameter of four shock absorber yokes, the operator loads the opposite four radial stations of a rotating base fixture. At the end of the broaching stroke, the fixture indexes  $90^{\circ}$  and automatically ejects the parts down a chute. Fixture then rotates another  $90^{\circ}$  for loading while the second broaching cycle is begun.

Operation is push-button controlled - output over 1100 pieces per hour.

Unusual tooling to meet specialized production requirements is constantly being de-

veloped through creative engineering at American. Whether your broaching problem requires the best in automatic or automated control, or simply an economical adaptation of a standard machine, you will gain by referring your requirements to American. American has been making broaches, fixtures and broaching machines — all three — for over 35 years. To put this experience to work for you, send a blue print or sample part. An American recommendation will be furnished promptly.

Ask for Catalog No. 450.





ANN ARBOR, MICHIGAN
See American First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

For more data circle 437 on Reader Service Card

placing only when suction loss is noted at the hood or vapor is discharging through the filter. Depending on the amount of mist, a filter pad will function efficiently for weeks or months.

Replacement is simple in that only a sheet metal cover has to be removed. Advantages claimed for the MistKolector are: cleaner air for the employees: a cleaner plant; reduction of painting and maintenance expenses and a reduction of fire hazard, according to the manufacturer.

For more data circle 96 on Reader Service Card



### LIQUID HONING PROCESS DETECTS IMPERFECTIONS

A positive method of detecting cracks and other imperfections in new and reground carbide tools depends on surface conditioning with Vapor Blast liquid honing equipment. The process has been devised and marketed by Vapor Blast Mfg. Co., 3013 W. Atkinson Ave., Milwaukee 16, Wisconsin.

Liquid honing uses abrasive and hydraulic action to force fine sintered material out of minute cracks or fissures. which then become obvious defects during visual inspection. Because of heat and pressure in grinding, such fissures are normally sealed and hidden by the sintered material; they do not always appear during inspection by acid etching, magnetic particle inspection or fluorescent penetrant checking.

Liquid honing removes burrs and grind lines and produces a satin matte finish without dimensional change. Inspection processing can be done at a rate of more than 100 single-point tools per hour. Other uses for standard li-



DRILL and PILOT BUSHINGS Frictionless -Rofary

For core drilling, T. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details

GATCO ROTARY BUSHING CO. 42330 Ann Arbor Road, Plymouth, Michigan

For more data circle 438 on Reader Service Card





complete line of carbide tipped combination ream, coun-

AND 10050 **Porting Tools** 

ter-bore and facing tools to machine standards. Combines 5 operations in one tooll Thoroughly proven.

WETMORE TOOL & ENGINEERING CO. 5320 E. WASHINGTON BLVD., LOS ANGELES 22, CAL.

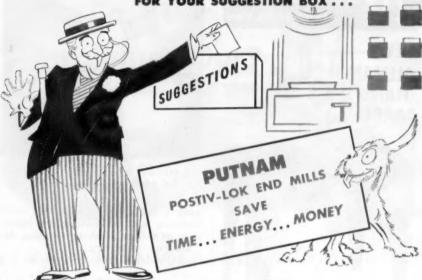
For more data circle 439 on Reader Service Card



# Here's an Idea



FOR YOUR SUGGESTION BOX .





Postiv-Lok tooling reduces costs as much as 25% or more by eliminating the integral taper shank from large end mills and putting it on a holder. The Postiv-Lok holder soon more than pays for itself through cost savings on end mills.

A machine equipped with a Postiv-Lok holder is quickly and easily converted from milling to drilling, reaming or other operations. Postiv-Lok adaptors for various tools assure easy insertion and removal from holder with a minimum of machine down-time.

Your local Putnam distributor will be happy to discuss tooling problems with you, make recommendations or quickly serve your needs with standard Putnam end mills.



For more data circle 441 on Reader Service Card

of your present free hand tapping time with this



Large T-slot table, machine vise and holding tools—articulate arm (adjustable height) and assortment of tap spindles permit tapping of an infinite number (and number of sizes) of holes without changing set up of work on table. Convenient bench-high bed on Cast floor legs. Movable pedestal has ground column with positioning clamp nut. Spindles guided perpendicular in wide bushing guide.



For more data circle 442 on Reader Service Card

new shop equipment . . .



Illustration showing Vapor Blast Liquid Honing results on carbide tools

quid honing machines include such toolroom and production-line operations as surface finishing, cleaning, descaling and deburring.

For more data circle 97 on Reader Service Card

# \* \* \*

### TWO STATION MACHINES DEBURR AND CHAMFER BOTH SIDES OF GEARS

A two-station Duplex Burr-Master, for the simultaneous deburring and chamfering of both sides of gears or splines, has been announced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. Both stations can be used for deburring and chamfering of the same size and type of gear or spline or different parts can be handled on each station, depending on production requirements.

Output rate at each station is up to 5 teeth per second with spur gears, helical gears and straight sided or involute form splines all being handled readily on the machine. Model BMED-24 has a work range from 0.625 to 6.5 inches pitch diameter with Model



# CHECKS AND BENDS IN THE SAME POSITION

Manufacturers with straightening, checking, and truing operations that require more than ordinary speed and accuracy have found Anderson Power Presses to be the answer to their problems. Here are the results they report:

"Straightened 30 pieces per hour with former equipment. With Anderson Press, 120 per hour. Production increase 400%."

"Anderson Power Press with its complete attachments is definitely more flexible for all types of straightening operations. It is faster, more accurate, and pressure is easily controlled. It is simple to operate."

"Formerly had a tolerance on drawing of plus or minus .002". After installing Anderson Press changed drawings to plus or minus 1/2 thousandth."

These actual reports from users prove that with an Anderson Power Press you get it straight — fast. Profit from low-cost high production, precision straightening.

Write for Bulletin 9-22.



ANDERSON BROS. MFG. CO.

For more data circle 443 on Reader Service Card

September, 1956

modern machine shop

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BMED-29 handling work from 3.0 to 9.5 inches pitch diameter.

The entire tooth form including the root of both sides of gears or splines is completely deburred and chamfered on the Duplex machine utilizing the patented cutting action. Depth of chamfer is infinitely adjustable to meet the



Modern Industrial Two Station Machine

production requirements of a particular gear or spline. Work cycle is automatic and electric

clutch stops machine with cutters withdrawn for loading and unloading. Separate motors and controls are supplied for each work station, permitting maximum flexibility in operation.

Parts to be chamfered are placed on the work spindle, taking central location from either the hole or shaft di-



\$1,600 COMPLETE.
FOUR STOPS.

BEST BUY FOR 5/8" AND 3/4" STEEL TUBING.

KILHAM ENGINEERING INC. R.F.D. NORTH ATTLEBORO, MASS. • MYrtle 5-6211

CURVIT 105

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS Simply insert in holes, invert, strike sharply and



, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.

Write for Circular NIELSEN TOOL & DIE COMPANY P. O. Box 1067 Berkley, Mich.

For more data circle 445 on Reader Service Card

For more data circle 444 on Reader Service Card

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modern machine shop

September, 1956

# Chica Contact Contact

greater cutting mileage!

eliminate down time!

Virtually all high-speed drilling jobs can be done by an in-stock Chicago-Latrobe Drill. So whatever your needs—look to Chicago-Latrobe. You'll find their line is complete, their quality tops, and their service unexcelled.

CHICAGO-LATROBE

Order Chicago-Latrobe tools from a service-minded Industrial Distributor in your area.



DRILLS - REAMERS
COUNTERSINKS - COUNTERBORES
CARBIDE TOOLS - SPECIAL TOOLS

ameter and vertical location from the edge of the gear or spline. Radial location and indexing of workpiece is taken from the gear teeth proper. To chamfer the gear or spline, two dove-



**LASSY** 

Supersensitive Hand Tapper

New exclusive features and top quality make Lassy Tappers oufstandingly the finest available. Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL COMPANY, Plainville, Conn. For more data circle 447 on Reader Service Card

FLYNN BORING HEADS



LEADING NAME IN
BORING HEADS FOR 40 YEARS
19 MODELS Write for catalog
FLYNN MANUFACTURING CO.
133 FLOWERDALE AVE. DETROIT 20, MICH.

For more data circle 448 on Reader Service Card

tail form cutters are stroked simultaneously past the edges of the teeth, one at the bottom the other at the top. Depth of chamfer is infinitely variable with the adjustment being made in the tool holders.

Fixtures for this machine are so designed that they can be replaced with other tooling when production must be shifted to a new gear or spline. Thus the machine not only gives the advantage of extremely high production but adds flexibility. Tooling developed on a master machine in the company's plant is shipped to the customer's plant and can then be dropped into position. The complete changeover for either station can normally be completed in about 15 minutes. With this preset tooling there is no need for trial cuts or gaging in setup as the machine produces a chamfer to desired tolerances with the very first cut.

Re-sharpening tools is equally simple. Only the cutter locating face of the dovetail form tools have to be ground. Relief grinding is not necessary, making it possible to get up to several hundred grinds per tool. The cutter is then replaced in the holder by being brought up against a stop, ensuring perfect cutter alignment.

The machine is equipped with upper and lower cam-actuated rocker tool as-

GRIND THE

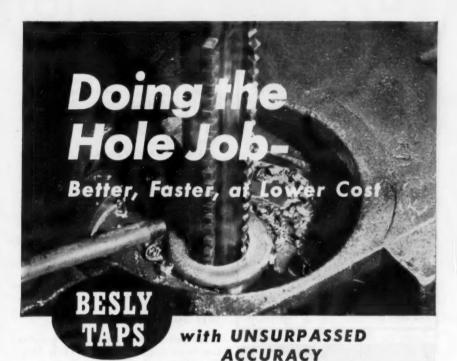
Eastern Centerless Way

> Our new plant with increased facilities assures

PROMPT SERVICE

Eastern Centerless Grinding Co 470 Tolland Street East Hartford 8, Conn.

For more data circle 449 on Reader Service Card



. LET US PROVE that Besly can help you get better threaded parts, longer tap life and lower tapping costs. Ask your authorized Besly Distributor for a TRIAL RUN on your toughest jobs . . . PLUS details on Besly's Super-Service on "Specials".



Tru-Square

at all vital points



Mirror-Finish

Solid-Ground THREAD FORM





Accurate

Microcentric CHAMFER



BESLY-WELLES CORPORATION

Established as Charles H. Besly & Co. in 1875 108 Dearborn Avenue, South Beloit, Illinois



For more data circle 450 on Reader Service Card



# No. 4B PUNCH

Capacity—1/4" hole thru 1/16 gage iron. Length—81/2"; Depth of throat—2". Weight—3 lbs.

Stock size punches—1/16" to 9/32" by 1/64". Can be had complete in metal box as shown or in cardboard carton.

W. A. WHITNEY MFG. CO.

640 Race St.

Rockford, III.

For more data circle 451 on Reader Service Card



Dowel — Straight Countersunk — Taper ± .0001" Accuracy .010" to .125" Diam. Up to 2" Length

Precision Centerless Grinding Since 1931 Inquiry Invited on Your Volume Requirements.

CENTERLESS
GRINDING CO.
6605 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3. 0.

For more data circle 452 on Reader Service Card

new shop equipment . . .

semblies, precision ball bearing intermittent indexing assembly with provision for radial adjustment of pilot gear for radial tooth location, and ball bearing mounted Vee belt drive totally enclosed with necessary safety guards.

Models BMED-24 and 29 Duplex are built to J.I.C. electrical standards. Two 1 h.p., 1,200 r.p.m., 220/440 volt a.c. motors are used, one for each station. Floor area required is 32 x 52 inches for Model BMED-24 and 37 x 57 inches for the BMED-29. Approximate weights of machines are 3,500 and 3,900 pounds respectively.

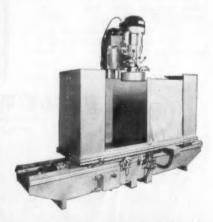
For more data circle 98 on Reader Service Card



### WET SURFACE GRINDER

An entirely new wet surface grinder has been designed by the Tillis Mfg. Co., Elkhart, Indiana.

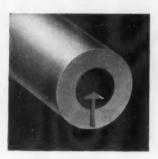
Originally planned for the automotive service field, the new Model 117 Surface Grinder has engineering fea-



View showing Tillis Wet Surface Grinder







# a hole here saves work

Crucible Hollow Tool Steel Bars take much of the work out of making ring-shaped steel parts, or tools with a center hole. The hole's already there. You save expensive drilling, boring, cutting-off and rough-facing operations...you reduce machine time and scrap losses.

Your Crucible representative can quickly show you how Crucible Hollow Tool Steel Bars will save you work and money. Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

For more data circle 453 on Reader Service Card

September, 1956

modern machine shop

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tures such as its ability to hold to tolerance of 0.0002 inch which make it attractive for many jobs in production and in the tool shop. The grinding wheel is 16 inches in diameter and takes work up to 42 inches high and 72 inches long. Feeds on both the spindle and the table are automatic, and machine completes full cycle without attendant.

Boosting production and saving operator time is a new jig which permits quick, easy set-up and rolls over the work for two or more side grinding. V-ways on both tables and base are hand scraped, and forced-feed lubrication assures long, trouble-free life.

Head raises and lowers on hand scraped ways driven by geared head motor. Portable coolant tank is mounted on wheels. Spindle is mounted on two pairs of precision ground, angular contact ball bearings. Motor is 10 h.p. axial gap type, 1,730 r.p.m. Base length is 144 inches. Table length 106 inches with table width of 30 inches.

For more data circle 99 on Reader Service Card



# TWO METAL WORKING INKS

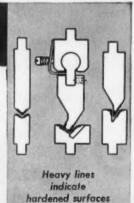
The Easy Mark Ink Co., Crosby and Butler Sts., Lowell, Mass., has announced the perfection of two inks for the metalworking industry, a metal layout ink and a grease cutting stamping ink.

The metal layout ink number 2100 has been formulated to meet the needs of machinists and tool and die makers. It gives a smooth uniform coverage for precise layout work on tools, dies and templates and does not chip or flake when scribed through. The ink can be



# for greater die life at no extra cost on any make of press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, Chicago induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on Chicago dies for your next press brake job.



Steel Bending Brakes for over 50 Years



For more data circle 454 on Reader Service Card



Single State of the State of th

H. D. BLOCKS



STANDARD STEEL BLOCKS



CROBLOX CARBIDE



ANGLE BLOCKS

For years Webber has dedicated itself to the production of gage blocks at a price that even the smallest shop can afford.

Quality and precision have not been compromised in this undertaking. Ask those who use them. Write for literature.

Webber

GAGE COMPANY 12899 TRISKETT ROAD CLEVELAND 11, OHIO

LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS

For more data circle 455 on Reader Service Card

September, 1956

modern machine shop

295



# grinders and buffers

You save when you buy and when you use QUEEN CITY Grinders and Buffers. Priced 20 to 30% under competing tools, they're built to stand up under the hardest use. Extra heavy spindles, extra duty ball bearings and special motors all contribute to long, low-cost service. 30-Day Trial Offer!

There is a complete range of QUEEN CITY Grinders and Buffers . . . floor and bench types . . in sizes from 1/3 to 10 H.P.

Write For Free Catalog Today!

QUEEN CITY MACHINE TOOL CO.
3911 Kellogg Ave. - Cinclanati 26, Ohio
"High Applity Law Cost - Fee Own 50 Year"."

For more data circle 456 on Reader Service Card

### new shop equipment . . .

applied with brush or spray and dries quickly. Acetone can be added for faster drying if desired. The ink is available in blue, red, violet, green, yellow and black.

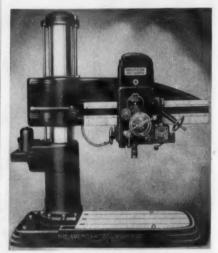
The number 2117 grease-cutting stamping ink is used principally for marking machined parts when it is preferable to leave on cutting oils as a preventative against corrosion and damage. It cuts through oil or grease on the surface and leaves a permanent mark. Available in black only.

For more data circle 100 on Reader Service Card



# RADIAL DRILL ATTACHMENT

In connection with the new deluxe models of its 9 and 11 inch column Hole Wizard radial drills, The American Tool Works Co., Cincinnati 2, Ohio, is now offering an attachment of particular interest to tool and die shops



View of American Tool new Radial Drill Attachment placed on Hole Wizard Drill



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

# On Brown and Sharpe, and other automatics

# **INSERT CHASERS SAVE UP TO 33%**

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$45 you get a dozen sets of 3/4—16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

free: "Unified and American Screw Thread Digest"

# THE EASTERN MACHINE SCREW CORPORATION

40-50 BARCLAY ST.

NEW HAVEN, CONN.

For more data circle 457 on Reader Service Card

September, 1956

modern machine shop

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# HIGHER SPEEDS! FASTER GRINDING!

# kipp

# AIR GRINDERS



The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

# kipp

MADISON-KIPP CORP.

208 Waubesa St., Madison IO, Wis., U.S.A. For more data circle 458 on Reader Service Card

298 modern machine shop

# new shop equipment . . .

and in fact to any shops doing precision boring on radial drills.

This attachment is known as a fine feed boring attachment and is furnished in addition to the standard feeding mechanism. The fine feed range for precision boring thus provided is one-fourth of the standard range supplying six feeds from 0.001 to 0.00625 inch per revolution of the spindle.

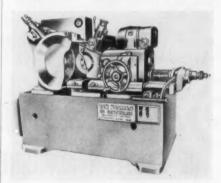
The change from the standard feed range to the fine feed range, or vice versa, is made instantly through a conveniently located lever at the lower right-hand side of the head.

For more data circle 101 on Reader Service Card

# CENTERLESS PRODUCTION GRINDING MACHINE

The Van Norman Machine Co., Springfield 7, Mass., has announced a new No. 2C centerless grinder. This rugged, precision-built, heavy-duty grinder incorporates many outstanding, exclusive features and advantages that result in more work per operator, per work shift. It precision grinds parts fast, holds tolerances and cuts costs.

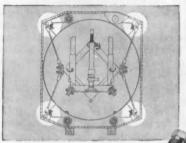
Actually three machines in one, the



Van Norman Centerless Grinding Machine

September, 1956

# TOOLING IDEAS your shop can use !



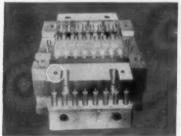
SPECIAL SWIVEL-PAD CLAMPS for a missile container manufacturer incorporate the remarkable Viter ball-joint construction. Eight Swivel-Pad Clamps are used to release tension on cables which suspend the missile in its shipping container. This particular model withstands 21,000 load spounds.

Shown below are just a few of the many uses for Vlier tooling accessories. Although these standard accessories are primarily used in jigs and fixtures, many companies are using them to replace custom-made devices in original equipment.



CLAMPING PARTS WITH OFF-ANOLE SUR-PACES is no problem when Viier Toggle Pads are used with a toggle clamp as shown here. The pad swivels 10° each side of the center line, assuring solid clamping of the part with no damage to the surface.





THIS 16-CAVITY, SIDE-ACTION PLASTIC MOLD uses four Viier S-66 Spring Plungers as detents to lock the side-action har in its travel to the center of the mold, eliminating costly, custom-made detents formerly used.



A glance at the riew 1956 Viler catalog will probably suggest many applications in your shop where you can standardize on Viler accessories. Write for your free capy today.

# New Head Design

on all Vlier Torque Thumb Screws protects working parts from dirt, chips, and other foreign matter. Truare ring makes disassembly easy. In all Vlier Torque Thumb Screws the ball-check is perpendicular to the screw axis, preventing uneven wear and wobble.



For more data circle 459 on Reader Service Card

No. 2C does the work of three centerless grinders without changeover time. It is a standard centerless grinder for throughfeed work, a standard grinder for infeed jobs and equipped with the crush dressing attachment, it forms grinds and does profile work. The No. 2C finish grinds parts from solid, or finish grinds rough turned parts.

The machine grinds a variety of small parts made of metal, plastics, glass, and so on, such as bearings, bushings, drills, bolts, valves and shafts. For more data circle 102 on Reader Service Card



### **NEWLY DESIGNED WAY WIPERS**

An economical way wiper is available which will save industry many thousands of dollars by increasing the service life of machine tool ways, as well as cutting expensive downtime and maintenance, according to the manufacturer. Produced by Chicago Rawhide Manufacturing Co., Sirvene Division, 1233 Elston Ave., Chicago 22, Ill., this new way wiper provides positive protection wherever metal parts slide over ways in close alignment.

It wipes the ways clean, excluding all dirt, chips, fine abrasives, cutting compounds and water emulsions but leaves a thin protective oil film. Designed and precision molded for extremely accurate fit, this way wiper prevents harmful materials from being trapped behind the wiping lip, assuring precision performance and increasing greatly the service life of the machine. The wipers will not smudge, mark or leave deposits when mounted on uneven surfaces.

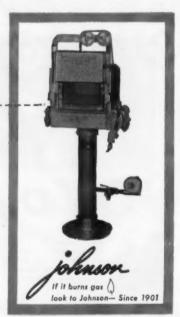
# HEATS FAST SAVES TIME

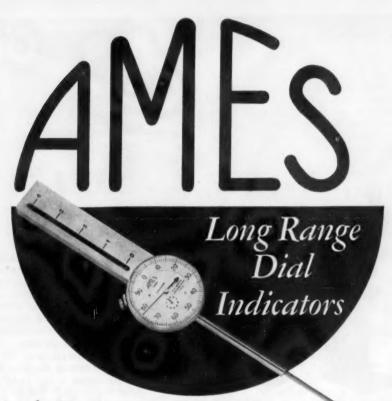
HOMMSON NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory ....\$337.00 Write today for free Johnson Catalog

JOHNSON GAS APPLIANCE COMPANY 571 E Avenue NW, Cedar Rapids, Iowa

For more data circle 460 on Reader Service Card





Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators;—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

Representatives in principal cities



29 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES . MICROMETER DIAL INDICATORS

For more data circle 461 on Reader Service Card

September, 1956

modern machine shop

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# new shop equipment.

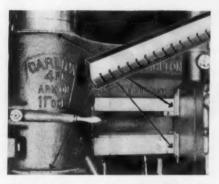
Quickly and easily installed on milling machines, shapers, grinders, planers, gear cutters, hydraulic rams, the wipers are made in four different types. all incorporating the same basic synthetic rubber wiping member. Type A is spring-loaded and enclosed in a



· Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.-Types include Vertical and Harizontal Multiple Spindles. Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO. 96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 462 on Reader Service Card



Chicago Rawhide Way Wiper for machine tools

metal case. Type B has a metal strip bonded to the member. Type C is a plain member. Type D employs a bonded finger spring. All four are 22 inches long and are easily cut to the required length. The necessary screw holes are drilled for attachment to the sliding member of the machine tool. Drilling the holes oversize, the manufacturer claims, permits the wiper, after long and constant use, to be easily re-set by loosening the screws and pressing the entire assembly closer to the rail.

For more data circle 103 on Reader Service Card



# AUTOMATIC INDEXING TABLE

The Wadell Equipment Co., 119 South Ave., Garwood, N. J., has marketed the Model AIT, automatic index-

**REDUCE** Set-up Time and the need for expensive jigs & fixtures

# HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

Write for Illustrated Folder

Value proved by years of use. WALTER W. FIELD & SON, INC 39 Hayward St., Cambridge 42, Mass.



For more data circle 463 on Reader Service Card



For comprehensive information on this widely used general purpose marking machine and other marking equipment send for our new catalog. Just write your name and title on company letterhead. The Noble & Westbrook Mfg. Co., 25 Westbrook Street, East Hartford 8, Conn.



For more data circle 464 on Reader Service Card

ing table, guaranteed accurate within 0.0005 inch of true position.

It is primarily intended for use on the Wadell vertical precision boring machines, wherein it may be used for boring, drilling, turning or reaming. However, it is readily adaptable to other machine tools. The table is completely electrical and can be synchronized with the machine cycle or manually indexed.

The index drive is a new development featuring a mechanism which requires only three moving parts. The accuracy is dependent on a uniquely designed master index plate precision machined by utilizing a jig borer which assures that the total tolerance of index positions is within 0.0003 inch.

The lock pin is heavy rectangular cross section and moves on pre-loaded

rollers eliminating all play. The table rotates on preloaded precision heavy-duty tapered roller bearings which provide rigidity and allow for thrust loads in all directions. The spindle is hollow affording means to adapt air or hydraulics used to actuate chucks or other holding means. The standard master plates have 12 index positions; masks are used in order to obtain spacings of 2, 3, 4 and 6.

For more data circle 104



Wadell Index Table



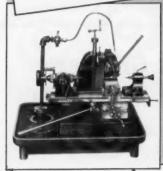
PRESSED STEEL STAMPING

**BRONZE CASTING** 

SMALL LOT TECHNIQUE



MODEL No. 750 BED 22" CENTER HEIGHT - 7.50 CM COLLET CAPACITY - .315"





ELECT LATHE - 18" BED CENTER HEIGHT - 2.35" (6 CM)
CHUCK CAPACITY - .004" to .315" MICROMILL

2 TABLE SURFACES: 7%" × 2%" 12" x 2%" TAKES MAGNUS COLLETS



BED 12" CENTER HEIGHT - 5 CM COLLET CAPACITY - . 1969"

MASS.



MAGNUS LATHE - 12" BED CENTER HEIGHT - \$ CM COLLET CAPACITY - .315"

F. W. DERBYSHIRE, INC. 157 HIGH ST.

WALTHAM

Write for full details

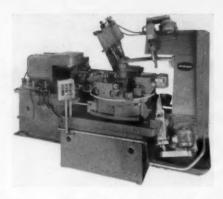
For more data circle 466 on Reader Service Card

### SPECIAL MACHINE FOR PROCESS-ING EXHAUST MANIFOLDS

The Michigan Drill Head Co., Detroit 34, Mich., has unveiled its latest Anglematic. This machine is used for processing exhaust manifolds for a V-8 automobile engine.

The machine has been designed to mill the locating pads and drill and ream the angular heat tube holes in an exhaust manifold. At 100 per cent efficiency, it will process 120 manifolds per hour and every operation is angular, except the milling of the locating pads. The machine equalizes the stock around the cored openings.

A 5-way angular and horizontal dial type machine, it features a 4 station automatic index table and power clamping fixture. The feed units consist of a standard horizontal hydro-5 col-



View of Michigan Drill Head Anglematic

umn assembly and 4 standard 9 inch stroke self-contained quill units. It is built to J.I.C. hydraulic and electrical standards and also features automatic lubrication throughout this processing machine.

For more data circle 105 on Reader Service Card



# **ONE** Drill Grinder Sharpens ALL Drills

- 90° to 140° Included Angle
- 1/8" to 21/2" Diameter
- 2-3-4 Flutes
- Without Chucks or Collets

Write for complete information on the STERLING Model "DV" Drill Grinder

McDONOUGH MFG. CO.

1521 GALLOWAY . EAU CLAIRE, WISCONSIN

For more data circle 467 on Reader Service Card

# "SAND-O-FLEX

helps us do an expert low-cost deburring job."

> says R. S. Wright, owner of Wright Deburring Com-

"Deburring is our business," states Wright, "and we have to deburr and clean up metal parts faster and cheaper than the parts manufacturers can do it themselves or we couldn't stay in business. It must pay them to ship their parts to us for deburring rather than do this job in their own plants.

"We use Sand-O-Flex on many different kinds of castings and machined parts. We find it does an excellent job and helps us keep our labor costs down,"



entire plant is devoted to one operation only-deburring metal parts. He uses Sand-O-Flex on all types of materials (steel, chrome, aluminum, brass, magnesium, etc.), especially on those with irregular shapes. Sand-O-Flex is attached to a bench arbor for deburring small parts and

There you have it from a man whose to a portable electric drill for larger pieces. Sand-O-Flex holds close tolerances when necessary, never digs into the metal or "flats" curved surfaces. Investigate Sand-O-Flex for your complex deburring problems. Write for catalog today giving prices and description of all four Sand-O-Flex models.

# MERIT PRODUCTS, Inc.

4023 IRVING PLACE, CULVER CITY, CALIFORNIA

For more data circle 468 on Reader Service Card

# FOR NAME PLATE AND TAG

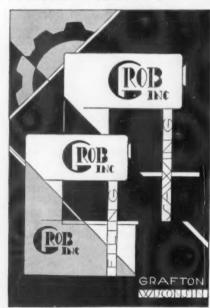
Use ACROMARK Numbering Machines



The ACROMARK Company

9 MORRELL ST., ELIZABETH, N. J.
"The Original Marking Specialists"

For more data circle 469 on Reader Service Card



For more data circle 470 on Reader Service Card
308 modern machine shop

new shop equipment . . .

### UNIVERSAL TEST INDICATOR

A shock-proof movement, exceptional sensitivity and accuracy are the features of the improved "Puppitast" universal test indicator, introduced by the Geo. Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. Contact points now have a threaded base, making it possible to screw them into a rotating axis at the tip of the holder in order to interchange points in a few seconds.

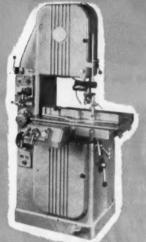
The indicator comes in two models—Model A reading in 0.0005 inch increments with a total range of 0.030 inch, and Model B reading in 0.0001 inch increments for a range of 0.010 inch. Other improvements are shank lengthening of the contact point in the Model A and diameter reduction of the ball tip to 0.078 inch. A matt non-reflecting finish for reading ease on the dial has been selected for sharply defined graduations.

For more data circle 106 on Reader Service Card



View of Scherr "Puppitast" Test Indicators: (Left) Model A and (right) the Model B.

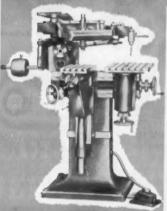
# AT LOWER COST! LIBERAL TERMS



Kelle Model K-16 Vertical Contour Metal Cutting Bandsaw

Cutting speeds from 33 to 2400 ft. per. min. Table swivels 15° on four sides. \$1695.00

# UNUSUAL HIGH PRECISION PEAR 3 and 2 dimensional Pantograph Engravers



PEAR
3 Dimensional
Model PF/2
\$2695.00



PEAR

2 Dimensional Model CG/3
\$1495.00



ABENE
Combined Vertical-Horizontal

MILLING MACHINES



IMPERIAL
VERTICAL MILLING MACHINE
\$1595.00



STARRETT
Optical Jig Borer

# AARON MACHINERY CO., INC.

Dept. M • 45 Crosby St., New York 12, N. Y. • WA 5-8300

Branches at: Buffalo, N. Y.; Mineola N. Y.; Los Angeles, California

See Page 81

### TOOL FOR TURNING, PROFILING AND CHAMFERING

A new Kendex tool, style KSDN, designed for turning, profiling and chamfering in either direction, has been announced by Kennametal, Inc., Latrobe. Pennsylvania.

This style of tooling, which has the same general shape as a style "D" brazed tip tool, is available with either a 7-degree positive or a 5-degree negative back rake. Both types feature square throw-away indexable inserts.

A choice of two styles of inserts are available for both the positive and the negative rake tool holders. They are:



View of Kennametal Style KSDN Kendex Tool

utility-ground top and bottom and precision-all surfaces ground. Precision inserts can be indexed to within plus or minus 0.001 inch.

Kennametal seats are furnished with all tools. Chip breakers, providing what is claimed to be the widest effective range of applications of any mechanical chip breaker known in the field are also available.

For more data circle 107 on Reader Service Card



For more data circle 472 on Reader Service Card



# Use Them For Pushing, Pulling, Pressing, Raising, Lowering, Clamping

In hundreds of simple applications Hanna Cylinder Power has eliminated or reduced manual effort, resulting in greatly increased production and lower costs. Similarly, machines and equipment using Hanna Cylinder Power are assured of long, dependable operation because of the quality and precision built into Hanna products. Your Hanna Representative will be happy to show you how Hanna Cylinder Power can lower your costs. See Thomas' Register or the classified telephone directory for the name of your nearest Hanna Dealer.

Send for Catalog 750A—Air Cylinders to 250 p.s.i., Hydraulic to 750 p.s.i.

Catalog 236B—Air and Hydraulic Cylinders to 110 p.s.i.

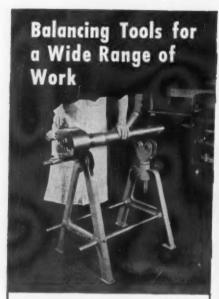
Catalog 2338—Hydraulic Cylinders to 1500 p.s.i.
Catalog 254 —Air and Hydraulic Valves.

Curaing 254 —Air and Hydraolic Valves.

# Hanna Engineering Works

1758 Elston Avenue, Chicago 22, Illinois

For more data circle 473 on Reader Service Card



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

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	Marit Lamitted	
Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

# FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 572.



SUNDSTRAND MACHINE TOOL CO. 2539 Eleventh Street, Rockford, Ill., U.S.A.

For more data circle 474 on Reader Service Card

new shop equipment . . .

# MULTI-USE LUBRICANT

Fiske Bros. Refining Co., Newark 5, N. J., has introduced a paste which, when dissolved in water, cools, lubricates, imparts a high finish to the product and lengthens tool life.

It is suitable for use in milling, drilling, grinding, lathe turning, sawing, planing, boring, reaming and similar operations where water solution is desired. According to the manufacturer, it assures a perfect cutting job at low cost. This is due to its lubricating quality and its high concentration. It can be diluted with 10 to 75 parts water.

Easily mixed with water, it stays mixed and will not turn rancid. Properly mixed it will not decompose or give off offensive odors. It is rust resistant and lubricating ingredients are present in emulsified form. It will not cause skin eruptions on hands of operators.

For more data circle 108 on Reader Service Card



# MICROMETER ADJUSTABLE CUTTING TOOL

A unique boring bar cartridge called the Acra-Bore, has been announced by the Gairing Tool Co., 2121 Hoover Rd., Detroit 32, Mich. It is a tooling system of independent single point tools.

These cartridges can be installed in cutting tools without sending to the factory for mounting. They are available from stock. Complete tooling can be designed and made to meet customer specifications.

Simplicity of installation is one of the important features. Simply by drilling two holes, reaming one and counterboring one and pressing the cartridge into the tool is all that is required to Get the complete, revealing

Inside Story

# on the finest tapping heads ever made!

Here's a feature by feature analysis on the amazing Procunier tapping line which clearly explains why they have consistently maintained tapping superiority in the industry for over 30 years! A true "peep-hole" story on the many outstanding construction improvements, the mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with a minimum of "down-time" interruptions,

accelerated production with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease and convenience that helps operators maintain stepped-up production schedules. "Do

more tapping, better, for less" is the slogan in progressive plants who have adopted Procunier heads in their tapping departments. Exclusive!

TRU-GRIP TAP HOLDER

A patented feature providing perfect tapping action close to walls and shoulders.

Find out how you, too, can benefit with Procunier — Write for Free Brochure Today

# PROCUNIER SAFETY CHUCK COMPANY

12 S. CLINTON ST., DEPT. 9 CHICAGO 6, ILL. PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, III., Dept. 9

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name\_\_\_

City

Y Zone State

For more data circle 475 on Reader Service Card

have a complete precision adjustable tool ready for roughing cuts or finishing cuts.

This unit is a successful departure from the accepted method of inserting tool bits in boring tools. The Acra-Bore provides micrometer adjustment and

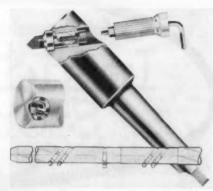


For small production runs on 1/8" to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened knurls of standard 1/2" dia. Forged steel frame is self-centering. Write for illustrated folder.

Dealers Inquiries Invited

# ROCKWIN' MANUFACTURING CO

. 80-D Magnolia St., Westbury, L. I., N. Y. . For more data circle 476 on Reader Service Card



View of Gairing Acra-Bore Boring Cartridge

positive positioning, rigid clamping with absolutely no back-lash in either direction for precisely projecting and retracting the tool bit to its original accuracy with ease.

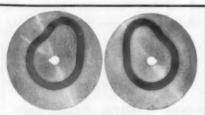
The Acra-Bore cartridge can be applied to boring bars and other metal cutting tools. It also may be used singly or in clusters in cutter heads for multi-purpose operations where close limits of accuracy between machined surfaces are essential.

The assembled unit is composed of a round tool bit, a threaded cartridge sleeve and a conical shaped adjusting screw and a socket head lock screw. The engagement of the adjusting screw and the tool bit ensures extremely rigid support of the tool bit in the toolholder.



A complete INCLUSIVE service

Every phase of cam technique is available here from application, design and straight through production. Consult Rowbottom.

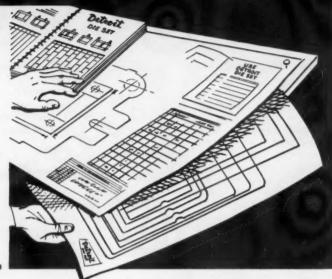


THE ROWBOTTOM MACHINE CO., WATERBURY, CONN.

Modern Cam Milling and Cam Grinding Machines are available from Rowbottom. Illustrated literature available on request.

For more data circle 477 on Reader Service Card

# Cut DIE COST...



BEFORE the design gets off the board Save die designing time with Detroit Die Set time savers. Easy-to-use catalog puts all needed information flat in front of you. Heavy paper die set templets (free on request) quickly determine size—save drafting time. Just slip under layout and trace most economical size for the job.

For more difficult jobs, a Detroit Die Set engineering representative is as near as your phone. He can quickly answer questions about special die sets, bushings, etc.

Start cutting die design cost now. Specify Detroit Die Sets. Available in all sizes and materials. Precision or Commercial tolerances. Stock die sets shipped within 24 hours. Unusually fast service on specials, too.

Offices in Principal Industrial Centers



2895 WEST GRAND BLVD. DETROIT 2, MICHIGAN

For more data circle 478 on Reader Service Card

Adjustment of the tool bit is controlled by means of a graduated styrene plastic adjusting wrench which suits the hole space (a movement of one graduation equals 0.001) and precisely projects and retracts the tool bit. The sturdy plastic wrench has greater visability than steel wrenches, according to the manufacturer.

There are no graduations on the cartridge to wear off because of chip removal. One mark or graduation is all that is needed on the bar or tool proper. An Allen wrench is inserted into the adjusting wrench and both are used for the adjustment. The Allen wrench turned left releases the friction and the adjusting wrench adjusts the tool bit and controls the setting.

Three sizes of cartridges are available. Tool bit sizes are 1/4, 3/8 and 1/2

inch. For each of the three sizes, a unit that is mounted 90 degrees to the axis of rotation and a unit mounted 53 degrees to the tool axis, is provided. The same graduated adjusting wrench is used for both mountings.

For more data circle 109 on Reader Service Card

### \* \* \*

### **30 DEGREE BORING BARS**

Everede Tool Co., Dept. 137, 2000 N. Parkside Ave., Chicago 39, Ill., has announced its new boring bars, exclusively designed for through hole boring and boring to a shoulder.

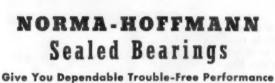
Tool bits are positioned in the bars at 30 degrees from the shoulder being bored, permitting the tool bit to cut ahead of the boring bar. Bars are manufactured in diameters from  $\frac{3}{8}$  to  $\frac{11}{2}$  inches and made of heat treated alloy steel to exacting specifications and precision ground. These boring bars feature mechanically-clamped tool bits







America's Most Complete Line of Self-Protected Bearings



There's a good reason why Norma-Hoffmann Sealed Bearings give such outstanding performance under all types of operating conditions.

First — the efficient seals, metal, synthetic rubber, or felt, keep grease in . . . keep dirt, dust and other harmful material out. The special seal designs eliminate race distortion, assure dimensional exactness and quiet operation. They simplify mountings . . . speed up assembly.

Second — all Norma-Hoffmann sealed bearings are "factory packed" with a carefully metered quantity of high quality filtered grease . . . grease that is highly resistant to oxidation . . . grease chosen to meet specific operating temperature requirements.

Result — trouble-free performance over long periods without regreasing.

Investigate Norma-Hoffmann sealed and other bearings for your equipment. Write for engineering assistance and catalog.



"Cartridge" Labyrinth Sealed Bearing

Rubber Sealed Bearing Felt Sealed Bearing

Special Seal Design PLUS the right grease for the application insures against dry bearings.

NORMA-HOFFMANN BEARINGS CORPORATION Founded in 1911 . STAMFORD, CONNECTICUT NORMA-HOFFMAN

HILD DEFICES.

Atlanta - Chicago - Cincinneti - Cleveland - Dallas - Denver - Detroit - Kansas City - Les Angeles - San Francisco - Seattle

For more data circle 481 on Reader Service Card

September, 1956

modern machine shop

Metal Socied

Bearing

317

which eliminate time consuming trouble with quality of brazing carbide tips. in addition to allowing the use of either high speed steel or solid carbide bits in the same bar.

Large area clamping distributes the clamping pressure over a wider bit



sides. Non-inflammable ace-

tate windows. Special style or size to order.

Write for details.

WADE INSTRUMENT COMPANY Dept. M. R.F.D. No. 1, Chardon, Ohio

For more data circle 482 on Reader Service Card



For more data circle 483 on Reader Service Card

### area. Positive seating of bit is assured by being firmly wedged down into V groove of bar, eliminating all tendency of the bit to move sideways while in cut and accurate positioning also assured when replacing tool bit. Built-in positive side rake is constant throughout entire length of bit. Sharpened triangular h.s.s. or solid carbide bits can be furnished from stock, ground with

View of Everede 30 Degree Lathe Boring Bar

the necessary clearance and cutting edge angles for boring to a shoulder. For more data circle 110 on Reader Service Card



### **NEW SERIES CEMENTED CARBIDES**

A new series of Firlomet cemented carbides has been added to the standard line by Firth-Loach Metals, Inc., Buttermilk Hollow Rd., McKeesport, Pennsylvania.

These carbides, which are produced to Firth-Loach's "laboratory grade" standards, include lathe centering blanks, roll turning and milling cutter blades and solid cylinders. The lathe center blanks are carried in seven sizes ranging from 1/4 inch diameter x 7/16 inches long to  $\frac{7}{8}$  inch x  $1\frac{3}{8}$  inches.



# SPEEDY and SAFE CASE HARDENING

NON-POISONOUS . NO SPECIAL EQUIPMENT

Indispensable for Machine Shops, Schools, Tool Rooms, Etc. 1 lb., 5 lb., 10 lb., 25 lb., 50 lb., 100 lb. containers.

# KASENIT COMPANY

3 KING STREET

MAHWAH, NEW JERSEY

For more data circle 484 on Reader Service Card



Our Dealer Gave Us This Valuable Data on

# MULTI-USE STOCK ABRASIVES

That do the work of "Specials"

Ask him—or us—TODAY—for the Brightboy Catalog. Gives methods and applications, machine speeds, grain and texture listings.

# A Completely New, Wider Concept of Abrasive Applications Replacing Costlier, Slower Methods

 Brightboy's unique abrasive-and-rubber action BURRS, CLEANS, FINISHES, POL-ISHES—FREQUENTLY IN ONE OPERA-TION! And offers new abrasive applications, never before associated with abrasive finishing.

STOCK Brightboy grains and textures are "JOB-MATCHED" to your requirements: Silicon Carbide and Aluminum Oxide abrasive grains, each in combinations of grain sizes and textures from extra fine to extra coarse, in soft, firm and tough rubber binders. These versatile abrasives invariably take the place of more expensive "specials", and do many usual finishing jobs also.

PROMPT SHIPMENTS.



Ask your dealer to recommend the Brightboy stock abrasives best suited to your requirements. Write us on any problem in which finishing is involved, and for the Brightboy catalog if your dealer cannot supply you.



BRIGHTBOY INDUSTRIAL DIVISION WELDON ROBERTS RUBBER CO.

95 North 13th Street . Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

For more data circle 485 on Reader Service Card

(Tolerance on diameter is plus 0.000 and minus 0.002 inch.) These blanks are centerless ground and are stocked in grade FA5, which readily adapts them for general machining and wearresistant applications.

Roll turning blanks, which are

ground on all surfaces, have rounded corners and are available in seven sizes. They are also made in cast iron grades. The solid milling cutter blades are stocked in three grades and in six sizes.

Solid carbide cylinders, stocked in 16 sizes, are in four grades for a wide variety of machining and boring applications. Sizes range from 3/32 inch diameter x 3/8 inch long to 1/2 x 11/2 inches. For more data circle 111 on Reader Service Card



Now you can custom design your own layout with Equipto modern-flow Benches. They can be easily arranged into one continuous streamlined assembly.

Many types and styles of drawers, drawer pedestals, cabinet pedestals, sliding doors, aerial shelves and accessories are available for Equipto Benches.

All Equipto modern-flow Benches are available with a choice of four tops . . . 12 gauge steel top, masonite covered steel top, resinwood or laminated maple top.

Send for big 16 page catalog No. 200 illustrating and describing this outstanding line of top quality benches.



Aurora Equipment Co.

606 Prairie Avenue Aurora, Illinois

Steel Shelving . . . Parts Bins . . .
Drawer Units . . . Lockers . . . Carts . . . Work Benches

For more data circle 486 on Reader Service Card

# \* \* \* MOTOR DRIVEN ROTARY HEAD

Multiplex Co., 1536 Getty St., Muskegon, Mich., has marketed a motor driven rotary head, designed also for manual indexing. Work can be positioned on a grinding machine table and rotated by motor drive with this new head. Workpieces also can be indexed manually for milling, drilling and boring operations.



View of Multiplex **Indexing Rotary Head** 

# Prutton

THREAD ROLLING MACHINERY

# King Size or Midgets...



THREADED NAILS

UP TO

50,000 PCS.

PER HOUR!

Regardless of size or type of threading, users of Prutton Exclusive Planetary Dies and Thread Rolling Machines are setting unbelievable records in regular production of threaded nails.

The reasons will be obvious after you actually see this famous engineering combination in action! Let us demonstrate and prove this conclusively. Send samples of your production nails for our recommendation—no obligation, whatsoever.



Prutton Corporation

5298 WEST 130th ST.

CLEVELAND 30, OHIO

For more data circle 487 on Reader Service Card

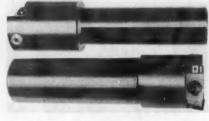
September, 1956

modern machine shop

321

The head is equipped with collets ranging from ½ to 1 inch, and with an interchangeable 4-inch three-jaw chuck. A 24-step plate and stop pin are employed for the index positioning. The motor rotates the spindle at about 250 r.p.m. Motor and spindle are assembled on a common base for application either vertically or horizontally. The motor is belt connected.

For more data circle 112 on Reader Service Card



View of Wesson Micro-Adjustable Boring Tools

Co., 1220 Woodward Heights Blvd., Ferndale 20, Michigan.

The boring tools are fitted with a vernier-screw adjustment for diameter of cut. The circular dial has 20 graduations, each graduation representing a total of 0.001 inch so that each complete revolution of the screw is equivalent to an advance or retraction of 0.020 inch. Backlash is not involved in accuracy of the setting since the head of the adjusting screw is positively pulled up

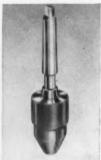
#### MICRO-ADJUSTABLE BORING TOOLS

A line of standard micro-adjustable boring tools employing indexable carbide tips which are thrown away when all cutting edges (up to 8 per tip) are dull, have been introduced by Wesson

# CHANGE TOOLS IN SECONDS, SAFELY!



Spindle never stops. To open —pull down, Jaws open automatically, release tool. To close—insert new tool. It's locked and centered.



Model A-capacities from 1/4" to 3/4" and 1/4" to 1/2" available with Nos. 1, 2 and 3 Morse Taper Shanks and Taper Adapters.

Drill, ream, counterbore with one spindle, without stopping spindle or moving work.

No keys, collets or wrenches are needed on Wahlstrom Fully Automatic Chucks and Tapping Attachments. Tool is automatically centered. Grip can't slip or chew tool shank. Wahlstrom Chucks convert 95% of lost tool changing time to productive time. And, a single chuck does work of several spindles. Write for spec. folder and distributor name. Made by the makers of the Float-Lock Industrial Vise.



AMF TOOL DIVISION

AMERICAN MACHINE & FOUNDRY COMPANY 224 Glenwood Avenue, Bloomfield, New Jersey

For more data circle 488 on Reader Service Card



3/8" - 7/16" - 1/2" and 5/8"

THIN SLOTTING CUTTERS

# 4"-5"-6"-8"-10" and 12" in diameter

with Jack-Lock® Blade Locking Wedges

• Designed specially for milling thin slots accurately and efficiently. Jack-Lock wedges extend the full width of the body. Consequently, locking pressure is applied parallel to the sides of the body, assuring true running at all times. Cutting faces of the blades are milled and ground to provide the axial rakes required. Easily converted to a half-side mill by simply inserting blades all of one hand. Extra large hubs provide added ruggedness and rigidity. Easily mounted on a grinding arbor for resharpening. Unsurpassed performance. Write for a bulletin today!



TOOL CORPORATION

Engineering and Sales Representatives in the Principal Cities

For more data circle 489 on Reader Service Card

# new shop equipment.

and locked against a locating face after the adjustment is made.

Among the striking features of the new boring tool line is the provision of an adjustable built-in chip breaker which also serves as clamp for the boring tip. Serrations on the clamp provide adjustment for positive chip removal control.

The line of boring tools permits the use (with changes of only minor parts) of round, square and triangular inserts. Actually all parts of the boring tools are identical except the tip itself and the adjustable anvil-locator in which the tip is mounted.

Relief grinding below the cutting edge is avoided in these tools by locating the cutting edge of the tip slightly above center.

This type of tool, using a special anvil-locator is especially adaptable to internal (American Screw) threading operations, using standard 60 degree triangular inserts.

For more data circle 113 on Reader Service Card



**Specifications** Table Movement: 6" x 10" Table Size: 7" x 171/2"

Handle your small part precision JIG BORING on the LINLEY

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large ma-chines for large work, where large work be-longs. You'll save money this way.

Complete details sent promptly on request

# LINLEY BROTHERS CO.

661 State St. Ext., BRIDGEPORT 1, CONN.

For more data circle 490 on Reader Service Card

#### \* \* \*

# SPEED CHUCKING LATHES

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has introduced its type CP Vertical, and type CSL, horizontal speed chucking lathes. These have been added to the company's line of speed lathes.

These units can be supplied with single, multiple and variable speed motors. They also can be supplied with electric brake motors for starting and stopping the machines a number of times every minute. Special spindle adapters can also be furnished. Various makes of hand or air chucks can be arranged for

# A Simple Formula for Solving Tooling Problems



CH TOOLS, Inc. Dept. 116-J Racine, Wis.

For more data circle 491 on Reader Service Card

# The COULTER "L1" AUTOMATIC THREADING LATHE

of diameters and lengths of threads
can be produced on it, without limitations . . .

# FASTER - ACCURATELY - AUTOMATICALLY!

It could be your solution to low cost threading! GET the facts!











The

Coulter
Machine Co.

641 Railroad Ave. Bridgeport 5, Conn.

Machine Tool BUILDERS Since 1896

For more data circle 492 on Reader Service Card

# SAVE DRILLS!

# PRECISION DRILL GRIND-ING BY ANY WORKER!

FOR DRILLS UP TO 3/4"

The BLACK DIAMOND Drill Grinder restores an old drill to like-new precision sharpness . . . in 10

seconds! Any inexperienced man (or woman!) is an expert grinder with this unit. Both lips ground at once... web-



thinning equally simple! Pays for itself many times over!

The WORCESTER Drill Grinder (now manufactured by Black Diamond) sharpens 2, 3, or 4-lip drills, flat, flat twisted or chucking, up to 2½". Clearances are easily and instantly changeable, feeding is controlled by micrometer adjustment

# FREE BULLETIN

Get all the facts! 4 page illustrated bulletin gives complete story Write Today!



# BLACK DIAMOND

SAW & MACHINE WORKS

71 NORTH AVE. NATICK, MASS.

For more data circle 493 on Reader Service Card

new shop equipment . . .



Standard Electrical Tool Speed Lathes

or supplied with the machines. In the event of an air chuck a foot pedal is standard equipment which simultaneously operates the air chuck and motor in proper sequence. Spindle speeds can be furnished to suit customer's own application.

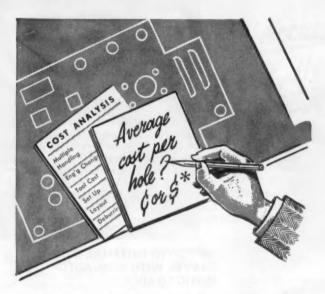
These machines were designed for secondary operations for finishing aircraft and automotive parts. Various operations can be accomplished on these units including deburring, polishing, blending and other operations.

For more data circle 114 on Reader Service Card

#### CRANE MOUNTED ON PRESS BRAKE

Because of growing demand by press brake users for overhead equipment for handling heavy plates into the machine, Steelweld press brakes, made by The Cleveland Crane & Engineering Co., 6416 E. 281st St., Wickliffe, Ohio, can now be obtained with a built-in crane.

The brake illustrated has a 3-ton hand propelled crane with electric hoist made by the Cleveland Tramrail



# How Much Are You Paying for Holes

Square holes . . . round holes . . . groups . . . louvers—the shape doesn't matter, but the number of pieces does. Producing holes in sheet metal or plate in small to medium production lots can be an expensive, time consuming job . . . unless you are using a Wiedemann Turret Punch Press.

With a Wiedemann, your short run piercing costs are cut 60% to 90%. The Wiedemann method eliminates both set up and layout—gives you almost unlimited versatility. The Wiedemann turrets carry all the punches and dies you need for a wide variety of jobs. Material is positioned quickly and accurately with a rapid-setting work locating gauge. This amazing Wiedemann method is so flexible that engineering changes can be made on the spot without costly production delays,



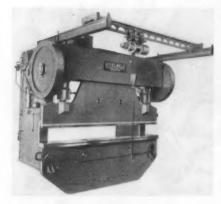
\*For example, Wiedemann users are selling short run chassis work at 1c per hole. What are your hole costs? Send drawings of your work for a free time study and cost analysis by Wiedemann. Write for Bulletin 101.

> From the small, hand operated R-2 to the 150-ton Turret Punch Press, there's a Wiedemann designed for your short run piercing needs.

# WIEDEMANN MACHINE COMPANY

4219 Wissahickon Ave., P. O. Box 6794, Philadelphia 32, Pa.

For more data circle 494 on Reader Service Card



Steelweld Press Brake with built-in crane

Division of the company. The crane is 18 feet long and can be traveled as far as 8 feet to the front of the bed center.

This brake is so large that it is necessary, because of shipping limitations, to provide a detachable bed which is secured to the machine by resting it on saddles at each end and bolting to the frame.

The machine is rated for 20 feet x 5/8 inch mild steel and will handle 16 foot plates between housings. Two speeds are provided: 7 or 21 strokes per minute. Overall dimensions are: length 22 feet, depth 11 feet, height 17 feet-2 inches. The bed extends 3 feet-8 inches below the floor.

For more data circle 115 on Reader Service Card

# IMPROVED INTERNAL GEAR SHAVER WITH SEMI-AUTO-

An improved Red Ring Model GCR internal shaver, featuring a semi-automatic loader that speeds loading and

MATIC LOADER



For more data circle 495 on Reader Service Card



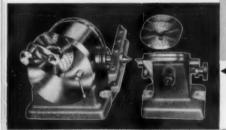
America's Largest Builders of -

# DIVIDING HEADS

#### MODEL SD

61/2" Swing, Spindle threaded 11/2"-8. 16" table slot tongues, 36 lbs.

160.00



# Accurate, Heavy Duty

Ball bearing thrust on worm shaft and rear end of spindle. Headstock spindle has threaded nose. Large tapered bearing adjustable for end play. Head tilts past 90°. Worm wheel and alloy stressproof steel worm cut to close limits for accuracy. Complete with three index plates for dividing all numbers to 50 and even numbers to 100 except 96T. Index chart shows all divisions obtainable to 380. Specify left (illustrated) or right hand model.



#### MODEL BP

11" Swing for plain milling machine. Spindle threaded 21/4"-10. 3/8" table slot tongues. 140 lbs.

#### MODEL AU

11" Swing. Fully universal for complete indexing and spiral cutting. Spindle threaded 21/4"-10. 5/8 table slot tongues. 190 lbs.

\$395.00





Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products













L-W CHUCK COMPANY

28 South St. Clair Street Toledo 4, Ohio

# Great Buys For

# VICTOR'S

25TH ANNIVERSARY YEAR

Our Special Import . .

# DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Regular Price	Our New Price	
\$ 6.00	\$ 2.85	
12.00	5.00	
21.00	7.50	
30.00	10.25	
54.00	15.00	
75.00	20.00	
102.00	26.00	
130.00	32.00	
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These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate
Delivery From Stock!

# VICTOR

MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. B. 251 Centre St.

Tel.: CAnal 6-5575, New York 13, N. Y.

330

For more data circle 497 on Reader Service Card

new shop equipment . . .

unloading operations, is now available from National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich. The semi-automatic loader avoids former hand loading and cutter meshing procedures in shaving internal spur and helical gears from 3 to 12 inch pitch diameter having teeth up to 4 diametral pitch and tooth face widths up to 2½ inches.

With the new semi-automatic loader, the operator merely hangs the gear to be shaved on the shaving cutter, presses a cycle control button and removes the gear from the workhead after shaving. When the gear is hung on the cutter, an approximate locator on the cutter head positions the gear in correct radial location. After the cycle, start and safety start buttons are pressed simultaneously, the cutter head advances and the part pilots into the holding fixture in the workhead. The part is then automatically clamped and the shaving operation initiated. Following



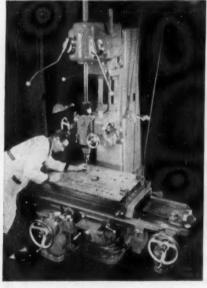
Red Ring Model GCR Internal Gear Shaver

# BUY Precision THAT FITS..!

for tenths
YOU NEED A
CLEEREMAN JIG BORER

OR

for .001"/foot
YOU NEED A
AYOUT DRILLING MACHINE



If your work involves gages, jigs, fixtures, or "jigless" production with ultra-fine tolerances, one of the three models of Cleereman Jig Borers is the answer.



But when your work calls for tolerances of .001" per foot, the economy of the Layout Drilling Machine is the "common sense" approach to your problem.

There are installations near you. Your Cleereman distributor can answer your questions and arrange an inspection visit for you.

BRYANT
Machinery & Engineering
• Company •

AND West Washington Fled.; Chicago &

CLEEREMAN MACHINE TOOL CORP.

GREEN BAY, WISCONSIN

For more data circle 498 on Reader Service Card

September, 1956

modern machine shop

331

the shaving operation, the cutter head retracts and the part is automatically released from the workholding fixture; being ejected to a position where the operator can easily remove it. In addition to the time saving features, the semi-automatic loader provides maximum operator safety.

For more data circle 116 on Reader Service Card



#### NEW SERIES OF END MILLS

Announcement of a new series of 23 sizes and styles of end mills for aluminum and its alloys has been made by Goddard and Goddard Co., Detroit 23, Michigan.

The new cutters now available from stock are standard with right-hand cut and right-hand spiral flutes. For rapid disposal while plunge cutting, they are



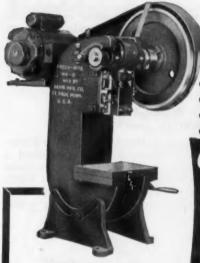
Goddard & Goddard End Mills for aluminum

manufactured with higher spiral flutes than conventional cutters. The mills also feature full end teeth to permit grinding various radii as required. Flute and faces are polished to facilitate chip flow; shanks are flatted for set screw.

Included in the group are several cutters featuring a 1½ inch shank diameter designed to meet the need for additional reach and rigidity on plunge cutting and profiling operations in aircraft and other industries. These fill a gap that has existed between 1¼ and 2 inch shank cutters. In the new series, the two-flute single end mills have a 4 to 6 inch length of cut; three-flute (one tooth cuts to center) cutters are



STILL THE LEADER IN IT'S CLASS!



MODEL 0 5 TON

# 5 TON PRESS-RITE

**POWER PRESSES** 

Compare Feature for

Feature

. . . the features you'd expect to find only in the larger presses!

\$267.00

(FOB St. Paul, Minnesota less motor & belt guard)

- Special High-Strength Frame with reinforcing ribs at all vital points.
  - -Reduces die-wearing deflection.
  - Increases Production between die grinds.
  - -Gives 2 to 3 tiems longer die life.
- Special Bronze-Bushed Flywheel.
- Bronze Bearings in both the main bearings and connecting rod.
- Bronze Wear Plate on back of ramways.

- Greatest Shut Height for their size!
   Permits using larger, more bulky dies.
- Adjustable Ram Gibs for more precise alignment.
- Open Back, Inclinable.
- Single Stroke Safety (may be quickly arranged for continuous operation.)
- Steel Bolster Plate.

Yes, Press-Rite Power Presses are built-forthe-job. Save money in your plant, switch to PRESS-RITE...Top buy in the field!

10 MODELS: 2-Ton, 5-Ton, 10-Ton, 15-Ton, 20-Ton, 30-Ton, 37-Ton, 45-Ton, 60-Ton, 85-Ton.

PRESS-RITE DIVISION

Write Today for Bulletin 955

SALES SERVICE MACHINE TOOL CO., 2355 University Ave., St. Paul 14, Minn.

Used by more . . . for more production

PRESSARITE

OPEN BACK . INCLINABLE Power Presses

For more data circle 500 on Reader Service Card

September, 1956

modern machine shop

333



For easy, economical machine shop cutting use one of these 8 sturdy

# DISSTON HACK SAW BLADES

They cut easily...resist wear and breakage. Get them through your



INDUSTRIAL DISTRIBUTOR

WRITE FOR LATEST CATALOG AND HACK SAW SELECTOR TODAY.

# Henry DISSTON DIVISION H.K.PORTER COMPANY, INC.

921 Tacony, Philadelphia 35, Pa.

For more data circle 501 on Reader Service Card

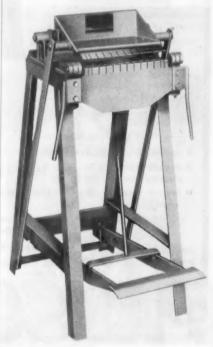
## new shop equipment . . .

available in this same specification. Four-flute, single end mills (two teeth cut to center) are available in 6 inch length of cut.

For more data circle 117 on Reader Service Card

# 12-INCH BRAKE HAS SLOTTED JAWS

Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill., has announced a unique, small bending brake. The brake features slotted jaws and apron, which provides speed and economy in a number of awkward metalworking opera-



Whitney 12 Inch Brake with slotted jaws



Vertical capacity of Arter Model B Hydraulic Rotary Surface Grinder can be increased 24" using a raising block. So, for grinding surfaces on such work as the crankshaft housing for the piston-type airplane engine, as shown, Arter has the answer. Arter has been building rotary surface grinders for nearly forty years. Model B is built in four sizes — 20", 24", 30" and 40" diameters.

Whatever your surface grinding needs, Arter can meet them.

# ARTER GRINDING MACHINE COMPANY

WORCESTER 5, MASSACHUSETTS

Jigmatic Automatic Tape Controlled Positioning Table • Rotary Surface Grinders
Flat Circular Cutter Grinders • Internal Grinders • Cylindrical Grinders • Carbide Tool Grinders
AGENTS IN INDUSTRIAL CENTERS OF UNITED STATES AND CANADA

For more data circle 502 on Reader Service Card

September, 1956

modern machine shop

335

tions. It is specially designed for bending up sheet metal strips on which one or more bent-up edges or seams have already been formed. A typical example is the forming of "drum return" used on metal sign letters.

The upper jaw, lower jaw and apron of this No. 99 Whitney-Jensen 12 inch slotted brake contain matching 3/16 inch slots spaced on 1 inch and ½ inch centers. The slots are ¾ inch deep in all members and the jaws are 12 inches wide, so the brake can handle any folded-up or seamed pieces from ½ inch wide up to 11 inches wide or better depending on how the folds are arranged in the pieces.

The capacity of the brake is 20-gauge metal of any kind including stainless steel. The upper jaw is in the form of an open box, to provide adequate stiffness yet remove sufficient superstructure so that strip undergoing a series of folds can be laid back closely over the top of the machine.

For more data circle 118 on Reader Service Card

#### \* \* \*

#### DIAL INDICATOR CALIBRATOR

Custom Scientific Instruments, Inc., 541 Devon St., Kearny, N. J., is now offering a Dial Indicator Calibrator for checking and calibrating the accuracy of dial indicators.

In operation, the principle involved is a plunger driven by a hardened wedge and a precision screw. The screw is operated by two dials. The outboard dial for fine control is graduated in 0.000025 inch. The inboard dial for rapid travel is knurled and drives the screw through a set of planetary gears. The range of the device

# HOW ARE YOU FIXED FOR BOXES?

Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.



For the best steel stacking box, its Sterling—its top rim construction makes it best.

Sterling makes all types and sizes of steel boxes.

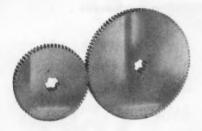
STERLING FACTORY EQUIP. CO. 183 Charles St., Providence, R. I.





For more data circle 503 on Reader Service Card

336





The

# **ADAMS**

Line Includes:

SPUR GEARS

HELICAL GEARS

BEVEL AND MITER

WORMS AND WORM

SPROCKETS

(Spur and Helical)

RATCHETS

SPLINED SHAFTS

RACKS

LEAD AND FEED

SHAVED TOOTH GEARS (Spur and Helical)

GROUND THREAD WORMS

# You'll profit by putting your gear problems in the hands of GEAR SPECIALISTS.

It takes experienced men and fine machines to make really good gears — Adams has both. In addition, Adams Gears are quality controlled at every stage in their manufacture to assure exact conformance with your specifications. This extra care means better performance for your product.

In many cases, custom made gears, designed especially for the application, will cut assembly time and lower unit costs. For complete information, write to The Adams Company, 1942 Cypress St., Dubuque, Iowa.

# The ADAMS Compa

Dubuque, Iowa, U.S.A.

ESTABLISHED 1883

FINE GEARS MADE TO YOUR SPECIFICATIONS







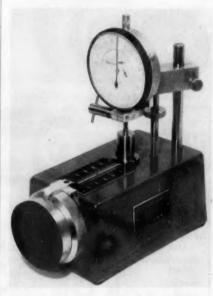
Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

# HOGGSON & PETTIS MFG. CO.

New Haven 7, Connecticut

For more data circle 505 on Reader Service Card

new shop equipment . . .



View of Custom Dial Indicator Calibrator

is 0 to 1/2 inch travel of CW or CWW indicators.

The housing is a stress relieved casting and all internal parts are hardened steel. An adjustable split take-up nut on the screw compensates for wear. For more data circle 119 on Reader Service Card

# TWIN ROTARY PRODUCTION GRINDERS

The Thompson Grinder Co., Springfield. Ohio, has announced the completion of a new line of twin rotary circular grinders with table work surfaces from 6 to 24 inches. With the new Type TR twin rotary grinder, it is said that cycle time is reduced 40 per cent because the operator loads one magnetic chuck at front position while another

# to economize STANDARDIZE





**Ring Standardized Punches** and Dies offer cost saving dependable performance for all of your perforating problems. Precision volume production to rigid specifications offers

- \* Low cost
- \* Complete interchangeability
- \* Immediate shipments from stock on Standards plus prompt delivery on Specials
- \* High quality long life

MANY SHAPES AND TYPES















RECTANGULAR Blanks — Pilots — Headless — Shoulder and

Transfer Punches

NEW!

Tough - Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG

JAMESTOWN, N. Y. 19 FENTON PLACE

For more data circle 506 on Reader Service Card

# PART FEEDER

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order.



Single & Multiple Spindle Magazine Feed Power Screw Driving Machines

For driving screws faster in products assembled with screws. These machines operate easily and require very little attention or adjustment when put in production.

Send sample parts when writing for quotation.

COOK & CHICK CO. 2415 WEST 24TH ST., CHICAGO 8, ILL.

For more data circle 507 on Reader Service Card



# CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

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1114 E. 87TH ST.

CHICAGO 19

For more data circle 508 on Reader Service Card

#### new shop equipment . . .

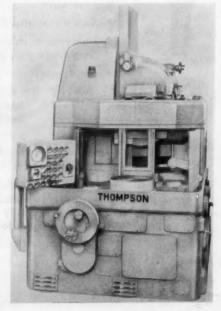
part is being ground automatically in rear position.

Typical job applications include automotive gear clusters, aircraft turbojet blades, automotive transmission gear faces, circular metal saws and many other intricate parts.

The automatic machine cycle is as follows: operator starts machine cycle by pressing cycle start button. Wheel head moves downward contacting the workpiece, rapidly and accurately, removing predetermined amount of stock. Then spark out cycle occurs.

The last phases start when the wheel head returns to up position; then the operator unloads ground parts and the grind cycle starts automatically in rear position.

For more data circle 120 on Reader Service Card



Thompson Twin Rotary Production Grinder

# **HARGRAVE CLAMPS**

Complete Line of Clamps for all Purpose

Individually
Power Tested
for Better
Performance.



"C", Steel Bar, Quick Acting, Wood Hand Screws, Welders

WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers. Carbide Drills, Washer Cutters, and File Cleaners. Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY
1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 509 on Reader Service Card

2 tools in 1

Costs less than one single purpose bar

# DUAL PURPOSE

for cutter bit at a 60° angle and end slot for cutters

For all makes of turret lathes, automatic chuck machines, engine lathes, precision bore machines, etc.

Made of alloy steel—black penetrated as a lifetime rust resistant—precision machined, hardened and ground. Stocked in stand. sizes—ETW 75 to 250.

OSCAR F. BRAUER CO., 10111 Edgewater Dr.,

Cleveland 2, Ohio

For more data circle 510 on Reader Service Card

# economically priced press room equipment



# DURANT "SURE-DRIVE" COIL CRADLE

Easy to load trouble free performance provides constant slack loop for feeding presses, forming rolls, shears, slitters, etc. Available in 11 models wide variety of capacity O.D. maximum ranges 36" to 48" and width maximum ranges 10" to 20".

WRITE FOR NEW FREE CATALOG

# DURANT TOOL SUPPLY CO.

PROVIDENCE 3, RHODE ISLAND

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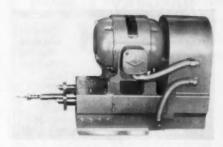


For more data circle 512 on Reader Service Card

# COMPACT LEAD-SCREW TAPPING UNIT OPERATES IN ANY POSITION

A new precision lead-screw tapping unit of advanced design has been announced by the Johnson Drill Head Co., 23rd Ave. and 20th St., Rockford, Ill., manufacturers of "Top-Flite" drilling, tapping and boring heads.

This new unit measures only 24½ inches in length, 11 inches in width, and 17 inches in height, yet is powerful enough to drive a ¾ inch tap in cast iron or a group of taps up to this capacity. It has a 4 inch spindle travel and can be used in any position, making it ideal for multiple station arrangements on fixed or indexing tables. Each unit is provided with its own control panel and capable of 30 reversals per minute. The unit permits quick,



Johnson Compact Lead-Screw Tapping Unit

easy lead-screw changes for flexibility. The lead screws are hardened and precision-ground for accuracy. The lead screw nuts can be adjusted for wear.

To avoid tool breakage in the event a tap hits a blind hole, the unit has a built-in, automatic safety clutch and spring-loaded spindle that automatically protect the tool, warn the operator and return the spindle.

For more data circle 121 on Reader Service Card

6" SCALE

**HARDENED** Guaranteed

Accuracy

within .001"

Double Length Vernier

# MUMMERT-DIXON FACINGHEADS

Two-way tool feed in 9, 12, 16, 20, 24, 30, 36, 40 and 46 sizes.

One-way tool feed in 6, 9 and 12 sizes. Automatic feed — convenient tool adjustment — quick feed reverse. Save time and costly setups.

Write for folder.



# **MUMMERT-DIXON CO.**

120 PHILADELPHIA ST

HANOVER, PA

For more data circle 513 on Reader Service Card

# THE HELIOS

CALIPER

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

\$9.90

The 55 A with set screw lock with one Inch and one Metric scale or all Inch scales:

\$8.90

All prices F.O.B. New York

Also available . . .

Dull Chrome finish calipers and Dial Indicator calipers

For details on other imported precision instruments, write



KARL A. NEISE, Dept. MMS 404 Fourth Avenue New York 16, N. Y.

For more data circle 514 on Reader Service Card

September, 1956



THE VAILL ENGINEERING CO. 133 E. MAIN STREET WATERBURY 20, CONN.

For more data circle 515 on Reader Service Card



For more data circle 516 on Reader Service Card

## AUTOMATIC FEED AND TWIN SPINDLES

An air-hydraulic feed, developed for use on U.S. Hand Mills, combines with a new 2-spindle head to double the production capacity of the mills. Announcement of the new feed was made recently by the manufacturer. U. S. Burke Machine Tool Division, 3 Brotherton Rd., Cincinnati 27, Ohio.

Equipped with a 12 inch stroke "skip" air-hydraulic table feed and two spindle heads, the unit performs its multiple functions in the following manner: the automatic table feed provides rapid approach, controlled cutting speed and distance, a second rapid approach, a second controlled cutting area and automatic rapid return. Two vises or other workholding

fixtures may be mounted on the table, so two or more workpieces can be milled during each complete

pass.

The two-spindle head can also be adapted to the company's hand or power table feed millers. The lower spindle is mounted in a fixed position. The upper spindle may be raised or lowered to handle various sizes and types of workpieces, and to compensate for any cutter wear occurring.

The lower spindle is diven by Vbelt from the



U. S. Burke Automatic **Feed and TwinSpindles** 



Johnson Metal Cutting Band Saws are fast . . . tough . . . and completely automatic in operation. Yet they COST LESS than comparative models. They'll cut anything in your stock pile safely and accurately . . tubes, rods, angles, heavy rounds, flats, and irregular shapes, too.



GET ALL THE FACTS Send for a Johnson catalog. See how a Johnson Saw will speed your production.



MANUFACTURING CORPORATION

For more data circle 517 on Reader Service Card



# WALTER

#### PRECISION DIVIDING ROTARY TABLES

With & Without Dividing Discs

- READABILITY: 6 SECONDS.
   CONSTRUCTED FOR LONG LIFE.
- . MAINTAIN PRECISION.

AVAILABLE IN 10", 121/2", 153/4", 193/4", 25", 31".

Also many types of Universal Precision Dividing Heads and Attachments for most economical production.

Test reports furnished with literature.

Sole Agents:

NEISE MODERNTOOIS KARL A. NEISE 404 4th Ave., Dept. MMS, New York 16, N. Y.

For more data circle 518 on Reader Service Card



12 position indexing • Machineable base Block can mount 4 different tools • 3 working positions • Precision made in West, Germany

Model	Tool Block	Tool Range	Price
21/2"	2½" x 1¾"	1/4" x 3/6"	\$16.00
31/2"	3½" x 1¾"	36" x 1/2"	\$24.00

For tremendous savings, write for circular listing sensational bargains.

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N.Y.
Telephone: Canal 6-4992

For more data circle 519 on Reader Service Card

September, 1956

# LIVE CENTER ACTION WITH DEAD CENTER ACCURACY

USE



ANTI-SCORING LUBRICANTS

PROVE IT TO YOURSELF IN

# YOUR OWN PLANT FOR ONE

INTENES & ON

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.

# TRIAL ORDER -TWO FOUR OZ. TUBES \$1.00

Send me my ord Bill me	ler of CMD right away I Bill my company
Name	
Company Name	
Address	
City	State
Chicago Manufe 1910 West 4	acturing and Distributing Co. 6th St., Chicago 9, Illinois

CHICAGO MANUFACTURING

For more data circle 520 on Reader Service Card

345

modern machine shop

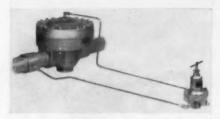
backshaft pulley. The upper spindle is driven through a gear train from the lower spindle. The spindles rotate in opposite directions to permit regular milling from both positions.

For more data circle 122 on Reader Service Card



#### PILOT-CONTROLLED AIR PRESSURE REGULATOR

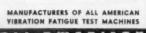
C. A. Norgren Co., 3435 S. Elati St., Englewood, Colo., has announced a new Model 20AA-16 Air Pressure regulator, a 2 inch pilot-controlled, high capacity regulator for extreme precision in air control over a wide operation range. This model reduces line pressures of up to 400 p.s.i. to working pressures of from 2 to 125 p.s.i. The range is minus 40 degrees F. to 200 degrees F.



Norgren 20AA-16 Air Pressure Regulator

The valve construction of this regulator is balanced to ensure a more accurate pressure control, minimizing the effect of a fluctuating primary pressure. The constant control pressure maintained by the pilot regulator makes possible a greater valve opening than obtainable with a comparable size spring controlled regulator. The Norgren Regulator has high air flow capacity with larger unrestricted air passages and a large diameter valve seat.







8043 LAWNDALE AVE., SKOKIE, ILLINOIS For more data circle 521 on Reader Service Card

346



1051 CHATEAU STREET, PITTSBURGH 33, PA. For more data circle 522 on Reader Service Card

MARKING TOOLS

# Extra Capacity with COLLET

SPEED. ACCURACY, ECONOMY

Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over

> or under stock size. Without adjustments. Shortest overhang. All grip ... no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

#### SATISFACTION GUARANTEED!

#### Made in Three Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16") Model B...2" (max. capacity 2-1/16") Model C...3" (max. capacity 3¼") Write today for illustrated catalog and price list - Dept.

#### HALL MANUFACTURING COMPANY 622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

For more data circle 523 on Reader Service Card

# 引引发引 多尹垂重力

FLAT TWISTED AND ROLLED SECTION

. SINCE

1903

#### Unexcelled in **Quality and Performance!**

HI-DUTY Flat-Twisted and Rolled Section Drills are produced by forg-ing and hot twisting bars of high speed steel. This method improves the structure by preserving the grain of the steel. Sizes range from 1/2" to 31/4" and larger. Milled type drills are also available—from 1/64" to 1/2" diameter. Hi-Duty means longlasting economical servicel

#### SPECIAL DRILLS

We manufacture a large variety of special types of high speed drills—special diameters and lengths; also step drills.

#### FAST DELIVERY . .

We can make immediate shipment from stock on many special drills! Contact your Industrial Supplier . or write today for Catalog and Price List.

#### HI-DUTY DRILL WORKS

FLEETWOOD, PENNSYLVANIA

For more data circle 524 on Reader Service Card

# CHECK YOUR BENDING PROBLEMS HERE:

These are representative of the 101 different bends you can quickly set up with a

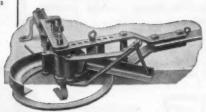
- 90° Bends on
- Heavywall or Standard Pipe
- Steel Tubing
  "U" Shapes, "U"
  Bolts, Square Cornered "U" Bolts, Clevises, Hooks,
- Links Angles, Offsets Square Bends, Irregular Shapes
- on Flat Stock
  Eye Bolts, "S" Shapes, Round or Square Stock

- Rings, Coils
- Centering Large Diameter Eyes
- Sharp, Square Bends on Flat Stock
- ☐ Flat Eyes. **Automobile Spring** Eves
- Angle Iron Flange In or Out
- Flat Stock Edgeways Round or Square
- Eyes on Flat Stock, Wire Conduit, Heavy
- or Thinwall

# HOSSFELD

**UNIVERSAL®** 

# IRON BENDER



## **Get The Facts!**

Write for bulletin showing bender models, standard and special dies, and il-lustrations of bends.

The Hossfeld Universal Iron Bender is indispensable for maintenance and production work in metalworking, custom welding and repair shops, industrial and engineering plants, institutions and vocational departments in colleges, universities, trade and high schools. It replaces special bending equipment. A Hydraulic Attachment (optional) enables one man to bend heavier material.

HOSSFELD MFG. CO.

402 W. 3rd Street

Winong, Minnesota

For more data circle 525 on Reader Service Card



A home appliance manufacturer was using four screw-machine stations for centering, drilling, counterboring and reaming for brass components. To increase output of the machines, Woodruff & Stokes was asked to design a combination tool to center, drill, counterbore and ream in one operation. The resulting tool cost half as much as the four tools it replaced, cut production time by two-thirds, by making double indexing possible.

Chances are, a tool designed by W & S small tool specialists can streamline your own production. Our tool specification sheet makes it easy for you to find out.



For more data circle 526 on Reader Service Card

## new shop equipment . . .

A pressurized chamber provides the control medium, eliminating the spring housing necessary on conventional regulators. This makes the unit amazingly compact and simple to install where space is a problem. Remotely controlled, this regulator can be installed at any point in the air system, regardless of accessibility. The pilot regulator can then be installed in a convenient location for easy adjustment of working pressure.

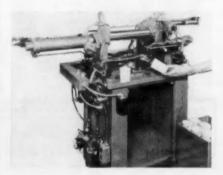
For more data circle 123 on Reader Service Card



#### MULTI-COLOR HOT STAMPING MACHINE

The Acromark line of marking machines has been expanded to include one that accomplishes multi-color marking of painted metal parts, plastic and wood. These machines are manufactured by Acromark Co., 9 Morrell St., Elizabeth, New Jersey.

These marking machines are also adaptable to the marking of steel, other metal parts and products by simply detaching the heating elements and stopping the Acroleaf feed. Flat dies are used to mark round parts by rotating



Acroleaf No. 9AH Hot Stamping Machine

# NumberAll

Model No. 50

AUTOMATIC INDENTING NUMBERING HEAD

Automatic indenting numbering head for consecutive or repeat numbering. 1/32"



up to 3/4" high figures can be furnished in sharp face Gothic or shaded Roman figures. Can be used in foot or power presses. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics. Heads are of sturdy construction and give uninterrupted marking service. Catalog MS-50 on request.

NUMBERALL STAMP & TOOL CO. HUGUENOT PARK, STATEN ISLAND 12, N. Y.

For more data circle 527 on Reader Service Card



# WOODRUFF KEY SEAT



High speed steel. Arbor type. Correct dimensions for Woodruff Keys, with ½2" oversize O.D. to permit resharpening. Regularly furnished without clearance on side teeth.

For quality, price and service investigate Keo combined drills and countersinks, T-slot cutters, center reamers and lathe mandrels. Big stocks for fast delivery.

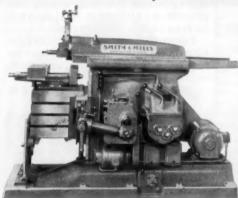
WRITE, WIRE OR PHONE for illustrated literature Jobbers' inquiries invited

# KEO CUTTERS 19326 Woodward Detroit 3 Mich

For more data circle 528 on Reader Service Card

# SMITH & MILLS SHAPERS

# for production and tool room



Bull ram gear, rocker arm and universal table trunnion made of ductile iron for extra rigidity. Compare Smith & Mills with any other shaper for versatility, speed, cutting power and precision performance. Compare and you'll buy Smith & Mills—famous for high quality shapers since 1888. Write or wire for prices, deliveries, repair parts or field service. Smith & Mills Shaper Division, Nebel Machine Tool Corp., 3409 Central Parkway, Cincinnati 25, Ohio.



For more data circle 529 on Reader Service Card

# G I COMETERS BUT DUT DUT DE LA COMETERS DE LA COMETER DE LA C



Always known for accuracy and long life, Slocomb Micrometers have been restyled and modernized to make them better than ever.

FINISH: a new satin chrome nonglare finish on thimble and sleeve. Non-slip black wrinkle finish on the drop-forged frames.

SERVICE: More than 700 different models in stock. Complete service department for prompt reconditioning and repairs.

LASTS LONGER: Slocomb Micrometers are made heavier to last longer. Spindle and threads are made of tool steel and double hardened. Send for complete details.



For more data circle 530 on Reader Service Card

# new shop equipment . . .

or rolling the part. For flat parts a roll die is used on the machine.

Overall dimensions of Acroleaf Model No. 9AH are 60 inches left to right by 24 inches front to back by 50 inches high. The stroke is 14 inches. The stand or steel cabinet on which the marking machine is mounted is 36 inches left to right by 20 inches deep by 32 inches high. A 110-220 a.c. connection provides the heat for the marking dies and electrical controls. The standard air line connection of 125 p.s.i. is sufficient for continuous operation.

For more data circle 124 on Reader Service Card



#### **HEAVY-DUTY DIE GRINDERS**

Three new heavy-duty portable pneumatic die grinders, in lever throttle or Q.A.W. versions, have been announced by the Master Pneumatic Tool Co., Inc., Bedford, Ohio.

Seventy-five per cent of the parts in the new die grinders are interchangeable in models that range from 3 inch grinders at 12,000 r.p.m. to ½ inch collet-type tools at 20,000 r.p.m.

Featured in the new line are increased power, larger blade area, longer rotors, streamlined contours and quiet, muffled operation.

Noise level is kept extremely low by



Master Pneumatic Heavy-Duty Die Grinders



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INDICATOR HAS:

1. 360° Reading Face 2. Shockproof Mechanism
3. Constant Accuracy

ROLDER IS Equipped with two screws...one for approximate setting, the other for final adjustment. A turn of swivel clamp and indicator works to 5" diameter ... with extension bar to 15".

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# NICKSON TOOL SALES CO.

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For more data circle 532 on Reader Service Card

# The ONLY Live Center On Which Points May Be Interchanged to ±.0001



Ask your local distributor or write direct for 26-page Catalog on Live Centers, Collets, Internal Collets, Draw Bars, and Turret Tool Posts.

# **Empire Live Centers**

Quality engineered for use on lathes, grinders, and milling machines . . . Empire Live Centers are versatile, accurate, heavy duty. Tapered seats give consistent precision alignment . . . assure accuracy of .0001. Positive seal eliminates dirt, grit, cutting oils. Combination bearings absorb both radial and thrust loads.



Manufactured in all tapers: Morse, Brown & Sharpe, Jarno, and straight shank. Special shanks and points to order.

Empire Toolmaker's Set available in handrubbed American Walnut case.

ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y. Ploneer 6-4245

For more data circle 533 on Reader Service Card

channelling exhaust air through more than 100 milled, gear-like slots around the circumference of the motor housing. The turbulence thus set up effectively reduces the characteristic exhaust air noise. Escaping air is diverted from the work, and away from the operator's hands through a thin-walled steel deflector shell which can be rotated through 360 degrees.

Cylinder liners are ribbed for strength and muffling qualities. End plates are machined from steel, carburized and hardened to a glass-like finish, greatly extending end plate life. For more data circle 125 on Reader Service Card

\* \* \*



when your press is equipped with the amazingly simple Dahlstrom Autostopi It's been tested and proven in years of actual use. Adjustable to work with blanking, progressive or compound dies. Mounts on stripper plate in 15 minutes—handles sheet steel up to 1/2" x 6" or equivalent weight. Lots of 12 or more, \$1.50 each. State whether for compound or

INCREASES progressive dies. Write for complete line bulletin PROFITS describing Autostop, Tap Guides and Tap Chucks.

## SMALL BORING MACHINE

The Jones & Lamson Machine Co., 521 Clinton St., Springfield, Vt., has recently acquired all manufacturing and selling rights to a small precision boring machine, which was developed by Mecanair, Inc., Sudbury, Mass. The machine was primarily intended for boring small holes in instrument parts and housings. It is capable of holding very close tolerances.

The machine is a compact unit designed primarily for small production lots. It is extremely versatile and is easily adapted to new jobs. The work table is operated by an air cylinder and hydraulic check unit, which can be adjusted for varying amounts of feed. A cross slide can be attached to the work table for facing in the same cycle as the boring operation. An additional head may be added to perform dual boring operations.

This machine has a large potential in the small instrument and electronics field. It is believed that a market can

BRANCH MFG. CO. 15 Olson Drive, North Branch, Minn. For more data circle 534 on Reader Service Card

\$175 each

PRODUCTION

\* CUTS WASTE

\* SPEEDS

rpm

INCREASE PRODUCTION . . . CUT TURNING COSTS

#### NEW C & J 16" GEARED HEAD ENGINE LATHE MODEL GH

- 12 geared spindle speeds provide
- enormous pulling power Choice of threaded or taper key drive
- Speeds to spindle nose 600
  - Heavy duty precision Timken taper bearings on spindle WRITE FOR BULLETIN ASSGH
- VARIABLE SPEED ENGINE AND TOOL ALSO NEW ROOM LATHE MODEL VS

WRITE FOR BULLETIN A56VS Carroll - Jamieson Machine Tool Co. BATAVIA OHIO U.S.A.

For more data circle 535 on Reader Service Card

# "WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

#### WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

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OLSON INDUSTRIAL PRODUCTS, INC.

For more data circle 536 on Reader Service Card

Precision Sharpen Your Die-Sinking Cutters on an

ALEXANDER



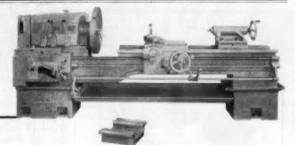
Over 1,000 sold in United States.
Write to Dept. C for catalog.

J. ARTHUR DEAKIN & SON

150-28 Hillside Ave., Jamaica 32, N. Y.

For more data circle 537 on Reader Service Card

# NEBEL Removable Block Gap Lathes



Swing all your odd-shaped, outsize turning jobs in the wide, deep gap of the Nebel removable block gap lathes. Replace the block and you have a standard lathe for normal turning operations.

This double duty feature increases the productive capacity of the lathe almost 50%, yet it costs only

a few dollars more than a standard lathe, Made in three swing sizes (see below).

Nebel also manufactures extension bed gap lathes, 20"/40" and 28"/50" sizes; standard lathes 16" to 36" sizes. Write for bulletins. Nebel Machine Tool Corp., 3409 Central Parkway. Cincinnati 25, Ohio.

	Swing over ways	Swing over   Swing thru   Bed		length*	Spindle speeds
		gap	min.	max.	range, rpm
16"/27"	18½"	27½"	6 ft	20 ft	13-400 or 24-750
20"/30"	22%"	31%"	6 ft	20 ft	10-320 or 20-640
25"/40"	27"	41"	10 ft	24 ft	9-280 or 16-500



For more data circle 538 on Reader Service Card

# Enco Turrets Assure ±.0005" Accuracy



Enco's passion for exacting accuracy is paying off in metal working operations everywhere! Combining precision lathe output with efficiency and economy has become a necessity . . . and Enco turrets have proved the ideal answer. An Enco turret transforms one lathe into a production machine, each operation of unsurpassed accuracy due to spring loaded ball design!



354

Spring loaded balls give you the accuracy you want! Hardened steel precision balls locked between accurately milled spherical seats consistently give accuracy in re-indexing. Hardened all steel construction minimizes wear, retains built in precision.

Write today for catalog No. 53. There's an ENCO turret for every lathe.

# ENCO

Manufacturing Company, 4520 W. Fullerion Ave. Chicago 39, III., Dept. 196

For more data circle 539 on Reader Service Card

new shop equipment . . .



J. and L. Small Precision Boring Machine

also be developed in the carburetor and fuel injection industry.

The new boring machine will be a product of Jones & Lamson's Thread Tool Division. The inventor will market the machine exclusively in the New England area, while the balance of the country will be covered by the Thread Tool Division's own personnel.

For more data circle 126 on Reader Service Card

# IMPROVED DESIGN ENGRAVING MACHINES

Models UE-3 and 3D-5 Panto-Engravers, manufactured by H. P. Preis Engraving Machine Co., 657 U. S. Route 22, Hillside, N. J., have been improved by providing higher cutter spindle speeds and a 2½ times more powerful motor.

With the ever increasing demands





for greater productivity and finer character reproduction, the manufacturer has succeeded in increasing cutter spindle speeds to 18,000 r.p.m. by replacing the original 1/15 h.p. motor with a 1/6 h.p., 3,400 r.p.m. motor.

All UE-3 and 3D-5 Panto-Engravers



View showing Improved Preis Engraver

now in production are being equipped with this new motor permitting above

cutter spindle speeds. Engravers now

in use equipped with the 1/15 h.p.

motor can be quickly and easily converted by simply replacing the motor

Many advantages are cited as a re-

sult of this innovation. Among the most important are: increased spindle speed so that the cutter can make a cleaner,

more defined cut in metals and provides greater versatility for operators

who use small cutters. In addition the engraver also provides plenty of reserve power and eliminates slow-downs on heavy cuts: speeds up production when

using tungsten carbide cutters on phenolic plastics, stainless steel and other

For more data circle 127 on Reader Service Card

Put Muscles In Your Lubricants

> ANTI-FRICTION COMPOUND

A clean white powder. Improves cutting oils. Dies last longer. Solves tough lubrication problems. Ask for free sample.

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OVER

Diamond

Wheels

SCIENTIFIC LUBRICANTS CO. Chicago 13, III.

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COMPLETELY ADAPTABLE - no bulky equipment. Easily installed on any make of machine. SIMPLE SPRAY ADJUSTMENT -- from fine dry to heavy moist spray . . . no fuss or muss. TWO NOZZLES - round-type for spot concentration, flat-type for wide coverage. VERSATILE — uses water soluble or oil base coolants. Simple air hose connection. ECONOMICAL - only \$37.00 complete pays for itself in a few weeks. Includes container, fittings, hose, tubing. Write For Free Bulletin -

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abrasive materials.

and motor pulley.

DEPT. HK-1

HAND KNOBS & SIZES CAST-IRON

> Tapped, Reamed or Blank Hex-shaped hub for extra tightening

> Write for catalog

TIETZMANN TOOL CORPORATION ENGLEWOOD, OHIO

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For more data circle 545 on Reader Service Card For more data circle 546 on Reader Service Card

# Designed for TOOL ROOM EFFICIENCY



· Write for literature on complete line of furnaces and ovens. Ask for Hints on Heat Treating.

# **HUPPERT Heat Treating FURNACE** Range: 300° F. to 2000° F.

Years of satisfactory operation in tool, die and machine shops, as well as laboratories have proven these furnaces to be ideal for production work. Huppert special features include High Temperature, Heavy Duty Kanthal elements—Multi-insulation—counterweighed and tight selfsealing door. Pilot lights indicate furnace operation. All connections factory installed, shipped ready for operation.

	Insid	le Dimen	sions		Prices 220 volt single phase					
Model No.	Wide	High	Deep	KW	with Huppert input controller	with electronic temperature centroller				
869	8"	6"	9"	4	\$280.00	\$480.00				
11	8"	6"	12"	4	298.00	506.00				
12*	8"	8"	12"	6	382.00	590.00				
12A*	8"	8"	18"	9	490.00	698.00				

\*For 2300° F. add \$95.00 to No. 12 and \$105.00 to No. 12A. No. 12A can be furnished for 3 phase at no additional cost. For floor model add \$52.00 to above prices.

K. H. HUPPERT CO. -

6841 Cottage Grove Avenue

Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens

For more data circle 547 on Reader Service Card

new shop equipment . . .

# SPECIAL DOUBLE AND HOLLOW SPINDLE LATHE

The Lehman-Brandes Machine Co., Chouteau and Grand Blvd., St. Louis 3, Mo., has designed and built a special double and hollow spindle lathe for profile boring and facing the precision



Lehman-Brandes Specialized Precision Lathe

front compressor shafts for J-57 jet engines, in one setting.

This machine is a heavy-duty 32 inch large hollow spindle lathe with a one-

piece 38-foot bed with a carriage on both ends of the headstock. On each carriage is a 24 inch hexagon turret mounted on 45 degree roller bearing angular slides, both being arranged with independent Turchan followers with indexing template holders for the several profiles of the various boring bars.

The heavy carriages have a series of spring loaded rollers supporting the major part of the carriage weight and both carriages have power rapid traverse and have automatic length stops which disengage the apronfeed handles.

With universal chucks on both ends of the spindle, complete machining of intri-



ALSO A COMPLETE LINE OF DUST COLLECTORS

AGET MANUFACTURING COMPANY
1398 EAST CHURCH ST., ADRIAN, MICH.

For more data circle 548 on Reader Service Card

cate profiles of the bore and facing of both ends is accomplished at one setting and in addition to the chucks on each end of the spindle, there is in the center of the spindle a hydraulically operated work support controlled by a small handle on the front of the headstock. This prevents any deflection of the workpiece between the two outer chucks.

A liberal flow of high pressure coolant is provided, carrying chips to a full length pan at rear of the lathe. Control of hydraulic driving clutches and hydraulic brakes is made at either carriage or at the headstock.

For more data circle 128 cn Reader Service Card



Seibert Floating Holder with a pre-set collet; Top, assembled; bottom, disassembled

new roller-type floating tool holder designed to cut costs and engineered for quick, easy tool changes without the use of wrenches.

The new holder features extra bearing capacity to withstand heavier thrust loads and an interchangeable collet. Collet is snap ring mounted and is driven by a hex shank and socket machined into the main body of the tool. In addition, an internal adjusting

#### \* \* \*

## FLOATING HOLDER FEATURES INTERCHANGEABLE COLLETS

Seibert and Sons, Inc., Chenoa, Ill., has announced the development of a



# THE ONLY INDUSTRIAL LAMP COLD TO THE TOUCH!

NO HEAT even with continuous burning of regular 100-watt bulb! Provides highest safety factor of any lamp made!

NEW 3-WAY HEAT ELIMI-NATION design, Faries exclusive, removes heat by radiation, reflection and convection. See cigarette test.

FRICTION-FREE design permits unlimited adjustability. No screws to tighten, "Stays put" in any position. Both arm and shade rotate 360°. Entire lamp approved by Underwriters' Labs.

WRITE FOR FREE ILLUSTRATED CATALOG #M-9

Faries LAMP DIVISION . ELWOOD, INDIANA

For more data circle 549 on Reader Service Card



# FAST DELIVERY . . .

from this medium-size Detroit stamping plant.

For value and service, Whitehead is your source. Any metal—any special material. Whitehead has dies on hand for O.D. sizes ½" to 18"; any I.D. you want; any thickness from .002" to 3%".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes.

Get this catalog for your files by writing Whitehead at Detroit. 55.4



# 1673 W. LAFAYETTE BLVD. DETROIT 16, MICHIGAN

For more data circle 550 on Reader Service Card

## new shop equipment . . .

set screw behind the collet permits presetting the cutting tool. The collet design eliminates pre-setting entire holders and serves to reduce the number of holders needed.

Two types of interchangeable collets of similar design are provided—one for taps and one for reamers. Both feature the Seibert trepan tool clamping principle which is accurately machined to assure close concentricity. The floating holders are available in all shank types and a range of popular sizes.

For more data circle 129 on Reader Service Card



#### ROTARY TABLE FOR TAG MARKING TYPEWRITERS

A rotary table, attachable to most models of Automark Electric Tag Marking Typewriters, which makes possible the accurate marking of round tags at high speeds, has been announced by the Defiance Machine & Tool Co., 1920 S. Vandeventer, St. Louis, Mo. This new rotary table is also attachable to the Automark hand lever ac-



View of Defiance Rotary Table for Automark Electric Tag Marking Typewriters

tuated typewriter. The manufacturer states that all parts of the rotary table are hardened and precision ground for long service life. It is a time and money-saving attachment that makes practically the entire line of Automark Tag Marking Typewriters now adaptable to any type tag marking use.

For more data circle 130 on Reader Service Card



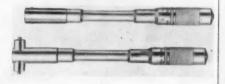
# SMALL DIAMETER INSIDE MICROMETERS

A line of small diameter inside micrometers has been announced by Rimat Gage Co., 21 W. Dayton St., Pasadena, Calif. Identified as P and PX-series, the new inspection tools are furnished with a wide variety of ranges beginning at 0.310 inch and proceeding upward through 1.250 inches, at which size the company's R-series continues to 9.500 inches.

P-series inside micrometers have gaging tips which are rectangular in cross-section, permitting the construction of a rugged mechanism for checking very thin grooves and recesses. The rectangular design also provides immediate centralization to a positive line-contact stop. When checking ordinary bores, the fact that no-rocking is required permits the use of these micrometers by unskilled personnel.

P-series micrometers have tip widths of 1/16, 3/32, and ½ inch. PX-series micrometers have tip widths of 0.015, 0.025, and 0.035 inch.

For more data circle 131 on Reader Service Card



View showing Rimat Gage Inside Micrometers

# STAMPINGS is as simple



NO DIES! Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.



TEMPORARY LOW-COST TOOLING! To produce something more than a few, but

produce something more than a few, but less than high production quantities, our simple contour dies— PLUS special purpose presses—keep costs low.



MODEST DIE CHARGES

on larger quantities! Here is where our regular production toolings apply to advantage ...to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.



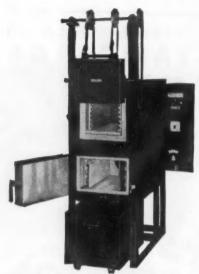
STAMPINGS DIVISION

3309 Union Street, Glenbrook, Conn. For more data circle 551 on Reader Service Card

September, 1956

modern machine shop

361



# SERIES 8055 COMBINATION MODEL

Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F.\* Quench tank included with the exception of the largest standard model.

Che	mber	Size	Pr	Prices							
	W.		2000° F.	2300° F.							
6" x	6"	x 12"	\$ 750.00	\$ 850.00							
9" x	9"	k 18"	1150.00	1250.00							
12" x	12"	x 24"	1600.00	1700.00							
18" x	18"	x 36"	2400.00	2500.00							
* Also	avail	able up	to 1250° F.								

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

# LUCIFER FURNACES, INC.

NESHAMINY 6, PA. Phone Osborne 5-0411

For more data circle 552 on Reader Service Card

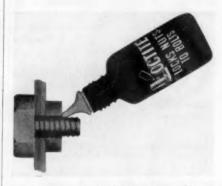
new shop equipment . . .

#### LIQUID CHEMICAL LOCK NUT

An entirely new method of locking ordinary threaded fasteners using a chemical sealant trademarked Loctite has been announced by the American Sealants Co., Trinity College, P.O. Box 260, Hartford, Connecticut.

This new liquid, with the appearance of kerosene, hardens automatically in the joints between metal parts, sealing the joints pressure-tight and bonding the parts together with a tough heat and oil resistant plastic. Machinery assembled with ordinary nuts and bolts which have been wetted by tumbling briefly with Loctite sealant will not loosen under the most severe conditions of vibration because the mating threads become filled with hardened plastic. Although providing a superior lock to mechanical type lock-fasteners. Loctite treated nuts and bolts can be easily removed with ordinary tools.

The problem of set screws which loosen can be effectively eliminated by treating them with this sealant. The sealant seals and bonds sleeve joints between metal parts without the use of corrosive fluxes and without danger of tarnishing polished surfaces with heat.



American Sealants "Locktite" Compound in use

Because it is a penetrating liquid which hardens automatically in pores or joints in metal parts, it is particularly well suited to sealing porous welds and leaky threads in pipe lines and process equipment.

For more data circle 132 on Reader Service Card



#### IMPROVED TORQUE THUMB SCREWS

Vlier Engineering, Inc., 8900 Santa Monica Blvd., Los Angeles 46, Calif., has disclosed that all models of Vlier Torque Thumb Screws have been redesigned to prevent dust, chips and other foreign matter from getting into the head release mechanism. The new design features a knurled ring which is held to the body of the torque thumb screw with a Truarc ring. While this feature makes the head dust-tight, it permits easy dis-assembling for cleaning if necessary.

Vlier Torque Thumb Screws are now widely used to hold parts securely in fixtures with a controlled amount of end pressure, supporting parts against

cutting tool thrust.

The new head design is now available on all models-regular, adjustable, tee head and inverted-at no increase in cost of the screws.

For more data circle 133 on Reader Service Card



Illustration of Vlier Torque Thumb Screw



HANDY, ELLISCO BRUSH TOP CANS MAKE IT EASIER FOR YOU TO APPLY AND STORE LAYOUT BLUE BRUSH KEEPS MOIST IN CAN CONTENTS WON'T DRY OUT 3 0Z. TO 1 QT.CAPACITIES. GET DETAILS AND BULLETIN NO. 60A.

George D. Ellis & Sons, Inc. 4024 N. American St., Philadelphia 40, Pa.

For more data circle 553 on Reader Service Card



# PRECISION DIAMOND

Industrial Diamonds Thread Grinders Turning Tools **Engraving Tools Dressing Tools** Diamend Powder

#### Manufacturers of DIAMOND WHEELS

and Hones of highest quality. Prompt delivery. Ask for literature

Representatives in Principal Cities



For more data circle 555 on Reader Service Card



of this type standard with

- greatest flexibility in drilling irregularly spaced holes
- sustained accuracy for trouble-free operation
   20 Standard Models—3 to 8 Spindles
- Special Models on Order

Write today for complete information on this dependable Double Eccentric Adjustable Drillhead . . . the latest addition to the Thriftmaster line of Single Eccentric, Universal Joint Type Adjustable and Special Fixed Center Drillheads.

Also Makers of DORMAN AUTOMATIC REVERSE TAPPERS

THRIFTMASTER

Products Corporation.

A SUBSIDIARY OF

THOMSON INDUSTRIES, INC.

1034 N. PLUM STREET \* LANCASTER, PENNSYLVANIA
For more data circle 556 on Reader Service Card

new shop equipment . . .

# FOUR ACCESSORIES FOR CONVERTING METAL LATHES INTO PRODUCTION UNITS

Four new accessories which will convert the Delta 11-inch metalworking lathe into a turret lathe have been announced by Rockwell Manufacturing Co., Delta Power Tool Division, 456 N. Lexington Ave., Pittsburgh 8, Pa. All four—including a bed turret, turret tool post, lever-type collet closer and coolant group—fit both the 4-foot-bed and 5-foot-bed models of the lathe.

With these accessories, the manufacturer points out, the lathe can be used on the production line for precision manufacturing as well as in toolrooms, maintenance departments and experimental departments as an engine lathe—the purpose for which the tool was originally designed. As modified by the accessories, the lathe is recommended for manufacture of duplicate parts and for primary and secondary operations.

For more data circle 134 on Reader Service Card



1834 N. PLUM STREET . LANCASTER, PENNSYLVANIA | Delta Accessories for lathe conversion

#### NEW COMBINED DRILLS AND COUNTERSINKS

Fastcut Tool Co., 7405 East Davison, Detroit 12, Mich., has announced a complete line of standard combined drills and countersinks.

Precision spiral cut flutes step up efficiency of the tools. This new design permits greater accuracy at higher cutting speeds due to the improved chip formation and freer chip removal. The

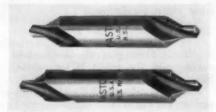


Illustration of Fastcut Combination Drill and Countersink; Top, Bell Type; Bottom, Plain Type

# PRICE LIST

# ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON		0				•				\$ 552
2-TON										\$ 627
5-TON										\$1,306
8-TON										\$1,356
0-TON										\$1,855
5-TON	9									\$3,401

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

## DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.



# HANNIFIN

HANNIFIN CORPORATION, 565 S. WOLF ROAD, DES PLAINES, ILLINOIS

For more data circle 557 on Reader Service Card

## new shop equipment . . .

spiral cut flutes generate less heat in cutting and the result is longer tool life.

Fastcut Combined Drills and Countersinks are made from highest quality,

high speed steel in the plain type, numbers 1 through 8 and in the bell type, numbers 11 through 18. Old letter sizes, plain and bell type, A-1 through N-2, are also carried in stock. Dimensions of all standard sizes conform to industry standards. The included countersink angle of each tool is 60 degrees.

For more data circle 135 on Reader Service Card

# STANDARDIZED MICRO DRILL GUIDES

All standard body styles available with hole sizes from \*\*80 to ½2". Tolerances of .0002 maintained on I.D., O.D., and concentricity. ENGINEERED MICRO-TOOLING, DRILLS, JIGS, COLLETS, ETC.

MICRO DRILL GUIDE



3980 Superior Ave., Cincinnati 36, Ohio

For more data circle 558 on Reader Service Card



For more data circle 559 on Reader Service Card

# INSPECTORS' PORTABLE

A portable unit for permanently reproducing inspectors' symbols, codes, O.K.'s, rejects and designs on machined, glazed or polished surfaces is now available from Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh 13, Pa. Designed to replace slower, less efficient methods of inspection marking. this portable unit, called the Airgrit, is especially applicable for carrying the mark to products during continuous production line assembly without interruption to manufacturing operations, or where the products are too bulky or heavy to be carried to the unit. Inspection of aircraft and automotive parts, electronic components, sheet glass, titanium, porcelain, stainless steel, plastics and similar items is easily accomplished during production.

This device, like the company's stationary models, marks delicate, preci-



For more data circle 560 on Reader Service Card

sion or thin-walled parts without the slightest danger of fracture or distortion. It leaves an etched impression on the surface of the part by blowing fine abrasive grit through the relieved portions of a rubber mask. Made to customer requirements, masks can be interchanged in a few seconds for different markings by snap-fitting them over the nose of the unit's gun. Both the

depth of marking (settings can be made for marking depth as little a 0.001 inch) and the marking time cycle are controlled. Slight finger pressure on the operating button, conveniently located on the holding handle of the gun, actuates the complete marking cycle.

Another important feature of this portable marking device is its ease of operation; any employee can master the marking technique in less than half-anhour. A lightweight, cast metal gun has been designed to completely minimize operator fatigue. The nose of the gun, containing the rubber mask, tact with the surface of the part to be marked and the buttonswitch is pressed to perform the marking operation. This marking may be performed with the gun aimed in any direction or at any angle.

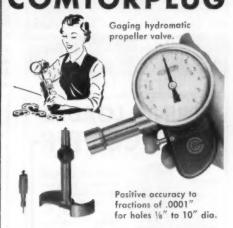
Since this unit is meant primarily for inspection marking, its use is recommended where the maximum mark is about ½ inch in diameter. On special applications, this marking area can be increased. The portable hose

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# have solved CRITICAL INTERNAL GAGING PROBLEMS with COMTORPLUG



Almost every volume-precision shop that learns about Comtorplug finds a use for it ... because Comtorplug is so positive, simple, easy to use and easy to read. A fixed – not passing – reading, to fractions of .0001". Exactly right for Statistical Quality Control programs.

# is placed in con- SEND FOR BULLETIN 49

It may hold the answer to a gaging problem confronting you.

# COMTOR COMPANY

64 Farwell St., Waltham 54, Mass.

For more data circle 561 on Reader Service Card



# new shop equipment . . .



View of Matthews Airgrit Marking Unit

and gun attachment is easily moved about for rapid production marking. The metal cabinet, which supplies the grit, is connected to the shop air line. Where more than one employee is performing the inspection at the same time and in the same general area, several hoses may be connected to the same cabinet. To avoid the possibility of an inspector picking up the wrong gun, the hoses may be color coded for positive identity.

Any desired inscription to fit into the marking limitations of the unit can be produced on the rubber masks, and characters can be as small as 0.055 inch in size. These markings can be produced singularly or in large quantities and from one mask several thousand impressions are received.

For more data circle 136 on Reader Service Card

# UNIQUELY LAPPED GRANITE SURFACE PLATES

A line of uniquely lapped black granite surface plates is now being marketed by Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, California.









Collins Lapped Granite Surface Plate

Seizure of gage blocks and checking fixtures, which has occasionally occurred when using granite surface plates, has now been eliminated by a unique lapping method which provides a continuous bearing surface interspersed with micronic valleys. These minute reliefs, formed by an exclusive lapping procedure, afford sufficient air pocket relief between bearing surfaces to prevent seizure of instruments. According to the manufacturer, the subdivisions of the grain pattern are so small as to be invisible to the naked eye.

The black granite surface plates are available in either two ledge or four ledge styles and are finished down to fifty millionths overall accuracy.

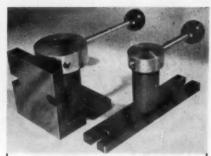
For more data circle 137 on Reader Service Card

## COMBINED DRILLS AND COUNTERSINKS

Keo Cutters, 19326 Woodward Ave., Detroit, Mich., has prepared a comparison chart showing the differences between the old combined drills and countersinks and the new standard that was adapted to simplify and improve the size progression.

Keo combined drills and countersinks are made of fine high-speed steel with ground spiral flutes.

Both the previous standard and the new standard, plain as well as bell



#### A PRECISION PRODUCTION HOLDING DEVICE

For drilling, tapping, milling, threading, reaming, etc., holding finished parts. Helpful on sub-assembly. Universally adaptable to drill presses, milling machines, surface grinders, tapping machines, etc. In 6 models, using 3C, 1A, 5C and 3AT Collets—capacity to 1", depending on Model. Prices \$29.50 to \$62.50. Write for further information and name of Tool Supplier. Territories open for Suppliers.

# ARROW 💬 MACHINISTS

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Attach this page to your letterhead and we will forward our new 16-page catalog to you.





# CONICAL TOOL CO.

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The WALTON Company HARTFORD 10, CONN.

These Specialized Tools will outperform all ordinary tools

and methods in doing one

Special job particularly well.

Write us, or simply attach this advertisement to your

letterhead to receive tech-

nical, descriptive folder #10 giving complete

specifications and prices.

For more data circle 566 on Reader Service Card

new shop equipment . . .



Keo Combination Drill and Countersink

type, are carried in stock for immediate shipment. Specials are available on short notice, to your blue prints.

For more data circle 138 on Reader Service Card

# SINGLE POINT THREADING TOOL FOR REVERSING LATHES

Easco Products, Box 587, Ypsilanti, Mich., has marketed a device known as the Spee-D-Thred, a single point threading tool for use in a reversing type lathe.

The tool bit employed in this new holder is secured in a head that rides on a cone point in the main tool body and is backed by a ball joint at the rear. The cone extends down through the body to a stud on which a cylindrical collar is threaded and adjusted to required height to support the point during the forward cutting stroke.

Reversing the lathe causes the cutting point and upper anvil to raise slightly to overcome backlash. This permits tool bit to turn to the helical angle of the thread and follow the thread back to the starting position without dragging. At this point the upper anvil re-engages and is ready for the next cutting cycle of the lathe because the lead screw and split-nut at no time have been disengaged.

Micro switches can be set to limit the forward and reverse travel of the carriage, making this single point threading operation fully automatic.

For more data circle 139 on Reader Service Card

#### AUTOMATIC INTERNAL PULL-DOWN BROACHING MACHINE DESIGNED FOR FLEXIBILITY

A pull-down machine has been built by the American Broach & Machine Co., Ann Arbor, Mich., to provide maximum tooling flexibility and easy maintenance in vertical, internal broaching applications. It is completely electrically controlled and all components are interlocked to provide continuous automatic operation.

For better maintenance accessibility, hydraulic systems are self-contained and are located outside the machine column. The unobstructed face of the heavy-duty column on this machine allows a wide range of tooling adaptation. The generous-size work table provides rigid support with minimum deflection for simple tooling as well as for the dial index type unit shown in the illustration. Hinged splash guards under the table open completely to give clear inspection access to broach puller assembly and coolant sump.

This machine can be tooled with new radially locked pullers, hydraulically actuated and electrically interlocked to the machine cycle. This assures that broaches are positively locked in the pullers before machine cycle can continue. A further electrical interlock can be mounted on the retriever unit which assures proper positioning of broaches in the retriever heads during the broaching stroke. The fixed main cylinder is constructed to operate a massive slide travelling on hardened and ground rectangular ways in the machine column. Retriever unit is mounted integral with the main slide and on its own set of hardened and ground ways, providing perfect broach alignment support through the major portion of the broaching stroke. Retriever bracket is hinge-mounted for broach removal.

As seen in the illustration, this broaching machine has provision for



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates
Toolmakers' Knees — "V" Blocks
Straight Edges (Bridge Type)
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# ACME TOOL CO.

73 W. Broadway New York 7, N. Y.

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# CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your inquiries Answered Promptly

HIMOFF MACHINE CO., INC. 23-16 44th Road Long Island City 1, N. Y

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# 1 Minute

to locate an edge within .0005"!



# JUMP EDGE FINDER

PRICE \$2.50 Complete satisfaction - or full refund.

Postage free if payment with order.

ELISHA PENNIMAN ELMWOOD 10,

For more data circle 569 on Reader Service Card



#### VERTICAL

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. \$9.95 complete with card, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor
territories still available.

# WALLS SALES CORPORATION

For more data circle 570 on Reader Service Card
372 modern machine shop

new shop equipment . . .



American PD-5-24-54, 25-Ton, 54-Inch Stroke Internal Pull-Down Broaching Machine

the adaptation of a chip conveyor, loading conveyor and work ejector for installations demanding fully automatic operation. The particular machine adaptation shown is the PD-5-25-54, 25-ton, 54-inch stroke, vertical hydraulic internal pull-down broaching machine, tooled for broaching the 1½-inch inside diameter of two 5 9/16-inches long steel sleeves, two at a time. The dial-type index unit on this machine has eight stations, four 2-station workholders and four 2-station broach return passages.

The broaching cycle is as follows: loading conveyor transfers two parts at a time to the index table, where they are indexed around to broaching position; retriever carries the broaches down through the parts and into the pullers; pullers lock and the machine slide starts on its broaching stroke; at end of the stroke, table indexes provide free passage for the broaches to return to starting position; and the table then indexes for the next broaching cycle of the machine.

For more data circle 140 on Reader Service Card

# ROTARY TABLE FOR CLOSE TOLERANCE WORK

The Morrison Engineering Co., 941 W. Lake St., Chicago, Ill., has designed a tool known as the Advance 15 inch rotary table. It is intended for all types of close tolerance work requiring rotational accuracy to within 30 seconds.

All parts operate in oil bath and the entire unit is self-oiling. The oil reservoir base is made of normalized semi-

steel and sealed against entrance of foreign matter and is equipped with a visual oil gauge. The table is equipped with a Timkin precision tapered roller center bearing and the rotating gear cut into solid metal.

The construction features of this table include a heavy rotating member of 15 inches diameter working surface with four T-slots. The brake is of the internal expanding type. non - influencing and is used as a back-lash eliminator. Double worm lock levers are provided to



View of Morrison Advance Rotary Table

prevent any movement or deflection of worm, even under extreme loads.

For more data circle 141 on Reader Service Card



#### STRAIGHT JAW, EXPANDING MANDRELS

The Le Count Tool Works, Inc., 390 Capitol Ave., Hartford, Conn., has recently introduced its new patented count-centric expanding mandrels with

# MAG TOOL Attaches

In Any Position To Ferrous Surfaces



MAGNETIC DRILL PI



Combines the capacity of stationary drill presses with the speedy convenience of portable hand tools for on the spot performance of all drill press functions. Mag-Tool goes straight to the job making it unnecessary to dismantle or move heavy equipment to stationary drill presses. EXCLUSIVE Micro-Matic adjustment enables precise positioning of drill bit after base has been magnetically locked to working surfaces! Patent Pending.

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Magnetic Tool Corporation, 1955 Lafayette St., Santa Clara, California

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For more data circle 571 on Reader Service Card



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LONGBOY DRILLS

Been buying costly "specials" for deep hole drilling operations? Then you'll be glad to know that Ace Longboy Drills are

now available from stock in a wide range of standard sizes and in both 12" and 18" lengths! What's more, their polished flutes are precision ground in top quality pre-hardened high speed steel to provide a finer finish, keener cutting edges, and longer drill life

Call your local Ace Drill Distributor today!

ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

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new shop equipment . . .



View showing Le Count Expanding Mandrels

straight jaws, which provide an extra long bearing surface over a wide bore range.

The increased bearing surface is longer than any other standard expanding mandrel and permits a greater bore expansion without change of jaws or sleeve which is ideal for precision production.

Permanent jaws maintain built-in precision on these mandrels to 0.0005 inch T.I.R. for Type B and to 0.0002 inch T.I.R. with Type SB. Permanent jaws maintain built-in precision and permit heavy cuts without chattering of the cutting tool.

A miniature duplicate of the Count-Centric straight jaw mandrels is the type M and SM micro-mite expanding mandrel. This smaller version is designed to enable precision instruments and electronic manufacturers to achieve miniaturization without the cost of special holding devices.

or more data circle 142 on Reader Service Card

# IMPROVED COIL STOCK

A complete series of improved Koil-Kradles has been announced by Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif. Handling coil stock up to 48 inches wide and 60 inches in diameter, in capacity ranges from 1,200 lb. coils to 16,000 lb. coils, these units are capable of supplying and maintaining a slack loop from which any automatically fed machine can

draw. By pulling from the slack loop instead of against the weight of a heavy coil, automatic feeding devices are far more accurate and considerably higher running speeds are practical.

Latest improvements include an actuating linkage which greatly increases versatility of operation without use of attachments or accessories. The linkage is fully adjustable within a 90 degree arc and is designed to permit use either inside or outside of the slack loop. This not only allows material to be fed normally over the top of the unit but also permits it to be fed directly from Kradle to punch press. Thus the material can be supplied either curvature up or curvature down, depending upon die design.

In operation, as the stock is used, all slack is tightened, depressing the spring-loaded actuator bar. This energizes the motor, rotating four power-



Benchmaster Koil-Kradle for feeding coil

driven rolls which cradle the stock, and forming a new loop. Release of the stock tension permits the actuator bar to open the motor switch. At this time the Variloop control, a time delay mechanism, keeps the motor running for an additional period up to 10 seconds. This eliminates continual motor stops and starts, smooths out the flow of ma-



## new shop equipment . . .

terial and reduces wear on motor and cradle, according to the manufacturer.

The roll extending across the actuator linkage is instantly removable by loosening two thumb screws which facilitates loading. All lifting is eliminated in loading. Coils are easily rolled up the ramp and onto the four hardened, power-driven rolls.

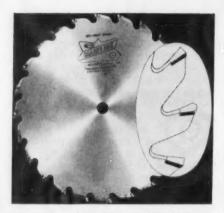
Depending upon size, the units are equipped with one or two guide plates by which stock is centered to the machine being fed. This eliminates any need for moving these machines when making alignment adjustments between unit and press. A single crank rotates three chain driven lead screws to position the guide plates. Larger models operating on 220 or 440 volts are equipped with J.I.C. type motor controls. For more data circle 143 on Reader Service Card



#### **NEW CARBIDE TIPPED SAWS**

An entire new line of carbide tipped saws has been introduced by the W. F. Meyers Co., Bedford, Ind., known as the Meyco Mainline Uni-Chip. The Mainline saws are popularly priced, and have high quality workmanship and material.

The Uni-Chip feature consists of alternating double-beveled and straight



View of W. F. Meyers Mainline Uni-Chip Saw

raker teeth, for long life in the cutting teeth and smooth, chip-cleaning with the straight raker teeth. Mainline Uni-Chip saws come in several diameters and with different number of teeth specially designed to produce smooth, fast cuts in non-ferrous metals, plastics and other abrasive materials, as well as in wood.

For more data circle 144 on Reader Service Card



#### **AUTOMATIC MACHINE FOR** MARKING PINION GEARS

Geo. T. Schmidt, Inc., 1806 W. Belle Plaine Ave., Chicago 13, Ill., has introduced its Model 395 pinion gear marker. It is specifically designed to mark

# **BRONZE BUSHINGS:**

- For the most exacting requirements
- · Made by skilled craftsmen
- Quality controlled by chemical and physical laboratory tests
   Machined on special, advanced design, high production quipment
- Shipped on an emergency basis when you need them

# LEADING SUPPLIER TO LEADING USERS

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BRASS WORKS, INC. 314 South Crawford Street Detroit 17, Mich., VI 1-4322



For more data circle 574 on Reader Service Card

code numbers on these gears as they come off the production line.

A single purpose unit, it is fed by a conveyor chain which carries the pinions under the concave lettering tool, after which they are rolled to the discharge chain from which they are ejected. The production rate is 900 parts per hour.

The machine is driven by a 1 h.p. motor, which drives the rotating feed

spider as well as the feed and discharge chains. A pneumatic cushion is provided in the die holder to accommodate diameter variations, thus ensuring uniform depth of marking on both low and high tolerance limits. Parts are rolled into locator chamber from which they are picked up by chain feed, thus accurately locating the impression. Dies may be made solid for fixed reading, or made up of individual type which provides flexibility in marking.

For more data circle 145 on Reader Service Card



Schmidt Gear Marker

#### AUTOMATIC MACHINE FOR PROCESSING REAR AXLE HOUSINGS

LaSalle Tool, Inc., 3840 E. Outer Dr., Detroit 34, Mich., has introduced a completely automatic machine, called the "Line-O-Matic." This machine is designed to be mounted right into a processing line and perform its series of operations completely automatical-



## new shop equipment . . .

ly. This machine processes rear axle housings for both passenger cars and trucks. Anyone of three different housings can be processed, on this one machine, with no additional locators being required. The machine handles a welded assembly, on which there has been no previous machining. It not only automatically pierces, extrudes, machines and assembles, but, in addition, automatically loads and unloads.

When the part is automatically loaded into the machine, from the conveyor line, it trips a limit switch, which in turn initiates the cycle of the machine. The part is shuttled to the next station and lifted into the fixture, after which, the shuttle returns. The part is located up-and-down from 4 points on the banjo face. The endwise location is taken

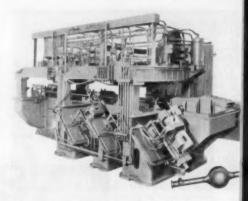


Illustration showing LaSalle "Lin-O-Matic"

from four points inside the banjo. Angular location, as well as up-and-down clamping, is taken just outside the banjo on the tube. All locating surfaces are dirt and chip free, because the locating surfaces are upside down.

At the first work station, drawing compound is automatically applied and then the drain hole is hydraulically pierced and extruded. At the next station, the drain hole is tapped for a 3/8 inch pipe plug; the vent hole is drilled to a 1/4 inch pipe plug. At the next work station, Permatex is applied to the drain hole. Incidentally, a built-in system, on the machine, meters and measures the exact amount required.

At the next station, the machine automatically feeds and runs the  $\frac{3}{6}$  inch pipe plug into the drain hole to 30 ft.-lbs. torque. The supply of pipe plugs is hopper fed. In addition, the vent hole is tapped for a  $\frac{1}{4}$  inch pipe plug. At the last station, the rear axle housing is turned over, and unloaded on to the conveyor line and, every operation has been performed automatically. The machine is built to J.I.C. hydraulic and electrical standards. There is automatic lubrication throughout, and a central coolant and chip system. The chips then feed on to a conveyor.

For more data circle 146 on Reader Service Card

# .0003 HOLE LOCATION IN 1 MINUTE

# \$2.50 NEW EDGE FINDER

YOU NEED THIS TOOL EVERY TIME YOU USE A DRILL CHUCK OF BORING HEAD in a VERTICAL MILL, HORIZONTAL MILL or JIG BORER, if the hole is located from a surface that has been ma hined.

- NO GUESSWORK OR EYE-STRAIN.
- LOCATES FROM FLAT OR ROUND SURFACE.
   LOCATES FROM STEP ONLY

.010" HIGH.

 MADE FROM HARDENED TOOL STEEL WITH ALL SUR-FACES GROUND.

Deluxe .200" model for small work and work with locating slots or cavities less than 17/32" wide . . . . \$10.00

GLOVER MFG. CO.

For more data circle 576 on Reader Service Card

#### TUBE CUT-OFF MACHINE

The Vogel Tool and Die Corp., 1825-26 N. 32nd Ave., Melrose Park, Ill., has disclosed a newly designed cut-off unit for use in shearing pipe and tubing. In a single downstroke of the punch press, this cut-off tool will shear off pipe or tubing in accurate lengths of 1/2 inch or more to within plus or minus 0.010 inch.

The manufacturer states that with this tool, costs run about 1/2 per cent per cut as compared to 7 or 15 cents with other methods. Depending on length and wall thickness, approximately 1000 to 2000 pieces of pipe or tubing per hour can be handled without crowding tool.

The blade can make 10,000 to 15,000 cuts and the die 25,000 to 35,000 cuts before resharpening. The blades can be easily removed and replaced. All blades and blocks are interchangeable and are obtainable in any size or diameter within range of the tool. The cut-off can

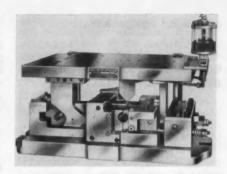
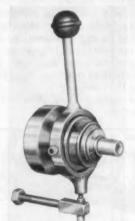


Illustration showing Vogel Tube Cut-Off

readily be removed, allowing the punch press to be utilized for other jobs. The unit comes in three standard sizes to accommodate tubing up to and including 1/2 inch o.d. by 3/32 inch wall, up to and including 2 inch o.d. by 1/8 inch wall and 3 inch o.d. by 3/16 inch wall inclusively.

For more data circle 147 on Reader Service Card

# The DAVOS COLLET CHUCK will...



# Increase Your Production . . . Make More Money per Hour!

The Davos Chuck brings your collet capacity up and above spindle bore. The Davos Chuck is a holding fixture, easily adaptable to any

turning, milling, drilling, grinding or polishing operations. The Chuck is hardened and precision ground throughout, to .0002 run out. Every part is carefully selected steel to guarantee utmost performance; and insures ease of operation.

The streamlined construction of the Davos Chuck makes it attractive, and easy to convert any machine or fixture into a time-saving production tool.

The Davos Chuck is built to fit all sizes of your Draw Collets from I.C. to 3.J. and up to 3" capacity. Also, any size of Step Chuck Collets, machined to your special requirements and featuring arbor to hold any bore from ½" to 3" and up -on your special request.

You do not have to buy special collets, you can use the Standard Draw Collets you already have on hand.

Write for Catalog.

R. C. MACHINERY CO., 4714 N. PULASKI

For more data circle 577 on Reader Service Card

#### CONTINUOUS PRODUCTION DRIVE DRILLING MACHINE

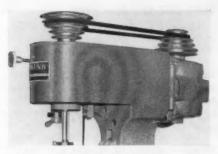
A new type drive for the Edlund Model 2F drilling machine, has been announced by Edlund Machinery Co., Cortland, New York.

The new drive is designed for companies having long production runs either at one or several pre-selected speeds. This machine employs the same construction and modern features available on the Model 2F machine, with the exception of the infinitely variable speed drive.

With single speed drive (single step sheave) positive drilling and tapping is provided directly from the motor through twin A-section V-belts to the spindle. Belt tension adjustment is made easily by the operator from the front of the machine.

With five speed drive (five step sheave) power is transmitted through positive grip B-section V-belt on a five-step sheave. Belt tension adjustments and belt speed changes are made easily from the front of the machine.

Both drives can be furnished in any selection of speeds and may be changed to other pre-selected speeds or be converted to the infinitely variable speed drive of the Model 2F drilling and tapping machine.



Edlund Model 2FV 5-Speed Production Drive

According to the manufacturer, the new drives offer lower original cost and positive control over speeds for production drilling.

For more data circle 148 on Reader Service Card



#### MULTIPLE MILLING CUTTERS

The design and manufacture of a line of multiple milling cutters has been announced by the Aber Engineering Works, Waterford, Wis. The milling units for production milling combine a wide range of these cutters for fast accurate cuts on any number of surfaces simultaneously. Side milling, slotting, straddle milling or any combination of these in one operation can be performed. If the unusually wide range of standard cutters does not meet specific requirements, the company designs and manufactures units to suit these unusual applications.



For more data circle 578 on Reader Service Card

Incorporated on all these multiple cutters is the unique curved tooth principle which provides shearing action instead of the usual digging and scraping. The corner of the tooth is built up and strengthened so that shock of contact with the work is eliminated.

For more data circle 149 on Reader Service Card

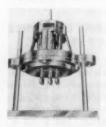
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## **NEW SPINDLE LOCATOR PLATE**

Errington Mechanical Labora-

tory, Inc., Staten Island 4, N. Y., has announced the introduction of the Spindle Locator Plate, a new addition to its line of universal joint drilling and tapping heads.

This plate converts the fully adjustable universal joint head to a controlled jig bored fixed center head. Locator plate can be adapted to ½, ½ and 29/32 inch capacity heads. The plates are made of sand cast aluminum, turned



View of Errington Spindle Locator Plate

all over, jig bored to the specific job and bushed. They are made to be interchangeable with the standard locator arms of universal joint heads.

For more data circle 150 on Reader Service Card

## MACHINE PERFORMS 47 AUTOMATIC OPERATIONS

Forty-seven distinct operations are performed automatically on one-cylinder or two-cylinder refrigerator compressor housings by a new high produc-



For more data circle 579 on Reader Service Card

## new shop equipment . . .

tion machine, Model 334-S, announced by the Morris Machine Tool Co., 934 Harriet St., Cincinnati 3, Ohio. The 18-station machine utilizes an 84-inch diameter table to process parts at the

rate of 120 per hour.

Designed for a leading appliance manufacturer, this machine tool eliminates model change-over problems by incorporating the company's standard production units. These are mounted on a basic center column machine equipped with an 18-station hydraulic indexing table. The total of 47 spindles are mounted on three 8-inch way-type units, six No. 2 Cam-matic drill units and eight Air-oil-matic drill units. They are used to mill, drill, counterbore, spot face, bore, ream and tap housings.

Unit-type construction permits fast, easy realignment of the machine for product model changes, for completely new models or for other types of products within the size limits of the machine. Adaptation is possible for almost any type product requiring multiple drilling operations on a mass production basis. Easy access to all tools is provided by the efficient mounting of the individual units. Vertical units are mounted on the stationary center col-



Morris High Speed Production Machine

umn. Horizontal units are mounted on pedestals attached radially to the cast iron base.

Operation is completely automatic. The machine operator merely loads unfinished pieces into air-powered clamping fixtures, unloads completed parts, at the rate of one exchange each 30 seconds. The fixtures, which accommodate either one-cylinder or two-cylinder housings, utilize an expanding arbor to locate the part with respect to a previous roughing operation.

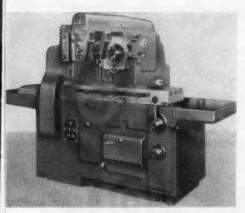
Each of the standard Morris drill units has independent feeds and speeds, permitting adjustment without affecting the entire machine. Preset for correct alignment, the individual unit performs the same operation each time the table indexes. All units are controlled simultaneously through an integrated electro-hydraulic system. The extreme flexibility of the machine is a reflection of the versatility of the drill units. The oil or air powered, hydraulically controlled Air-oil-matic drill units offer adjustable feed rate, feed stroke and total stroke.

The Cam-matic drill units provide electrically controlled, mechanically driven drilling and allied operations. An electric clutch simplifies construction and eliminates troublesome shear pins. The clutch mechanism is designed to slip when excessive thrust is required, thus preventing damage to workpiece or tool.

For more data circle 151 on Reader Service Card

# AUTOMATIC MILLING MACHINES WITH QUICK SET-UP FEATURES

A new line of automatic milling machines, having a number of advanced production features plus several unique features for convenience and simplification of set-up, has been announced by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. These machines, identified as Powermatics, are built in



Cincinnati Powermatic Milling Machine

plain, duplex and plain rise-and-fall styles. Much heavier and more powerful than the superseded models, Powermatics are said to offer increased cutting capacity (up to 10 h.p.) and higher spindle speeds (up to 3,000 r.p.m.) for taking conventional milling or climbing cuts with either high-speed steel or sintered carbide milling cutters.

Standard Powermatics, designated as the Series 200, are built in seven sizes of each style, from No. 205-112 (24 inch table travel, 5 h.p.) to 210-118 (96 inch table travel, 10 h.p.). Automatic cycles and manual manuverability have been combined to an unusual degree for production type milling machines. Through a cycle selector unit, a single lever initiates the complete milling operation; including automatic table cycle, automatic spindle stop, automatic backlash eliminator, automatic spindle carrier cycle of R&F machines, and automatic spindle retraction when this equipment is supplied. To aid in setting up the machine, all these automatic features can be nullified or bypassed for manual control.

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# new shop equipment . . .

# SPECIAL MACHINE FOR ASSEMBLING ROLLING HANGERS

The Detroit Power Screwdriver Co., 2807 W. Fort St., Detroit 16, Mich., has announced a special machine built to assemble semi-automatically rolling hangers for sliding doors, sliding screens, and so on. These hangers include three different styles. The assembly consists of a bracket, bronze bushing and nylon roller.

Three feeding devices feed the three components: the shoulder rivet, bronze bushing and the nylon roller. The three components are pre-assembled as follows: the nylon roller is fed from a vibratory feeder into an indexing dial. The bronze bushing or bearing is fed from another vibratory feeder and pressed into the nylon roller. At the next index the shoulder rivet is fed by means of a barrel or rotary feeder and inserted into the pre-assembled roller and bushing.

The completed assembly is then ejected into a track twisted 180 degrees, which feeds the completed three-part assembly into a locating fixture. The operator then simply places the steel

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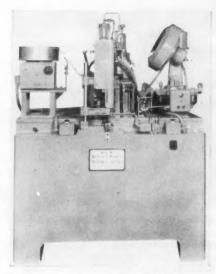
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modern machine shop



Detroit machine for assembling rolling hangers

bracket over locating pins in the fixture and touches two palm switches which, in turn, cycle the pneumatic-operated impact hammer. At the point of assembly, the hollow body of the shoulder rivet is flared, completing an integral assembly with a free-running selflubricating nylon roller.

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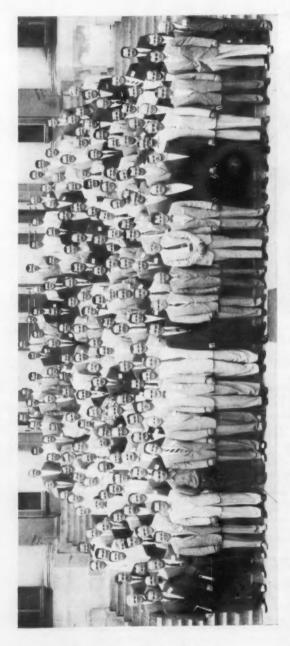
Application Blank in the hands of every employee, with the Treasury furnishing pay-envelope stuffers, posters and other literature. I was a little dubious about the personal canvass but our employees were enthusiastic, in fact, officials of our union volunteered to undertake the canvass. There was no pressure, no teams, no prizes—just the distribution of the Application Blanks."

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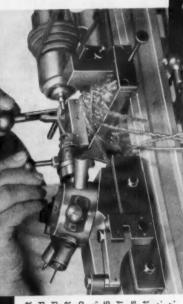


salesmen. Among the subjects under discussion during the full week of the conference were the following: Personal Qualifications of ing your Territory; Originating the Inquiry—Information Needed to Quote; Blue Print Analysis; Tooling Up the Job; The User Looks at the Machine Tool Industry; Economics of Machine Tool Replacement; Problems on Replacement; Sales Presentation; Work Simplification; Shown above is a group of "students" who attended the Machine Tool Sales Conference at Purdue University, Lafayette, Indiana, July 30 to August 3. The conference was open to employees of members of the National Machine Tool Builders' Association and American Machine Tool Distributors' Association. Professor Harry J. Loberg, Director of the Sibley School of Mechanical Engineering of Cornell University, was Educational Director, and Professor O. D. Lascoe, of the Purdue University's Department of Industrial Engineering, was in charge of arrangements. The conference this year afforded those attending with the excellent opportunity to review tested and proven selling methods and techniques, study procedures relating to replacement, as well as to exchange valuable sales experiences with fellow a Salesman: The Written Word-Correspondence; Analyzing Your Own and Customers' Personalities; What the Buyer Wants; Manag-Tools for Selling; Meeting Objections; Follow-Through After Order; Financing the Sale; Paper Work; Relations Between Builders and Distributors; Selling the Government; and Legal Aspects of Selling.

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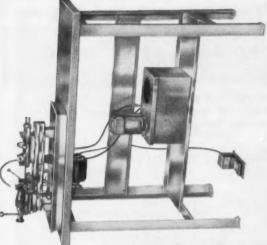
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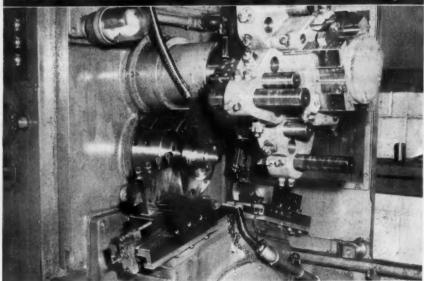
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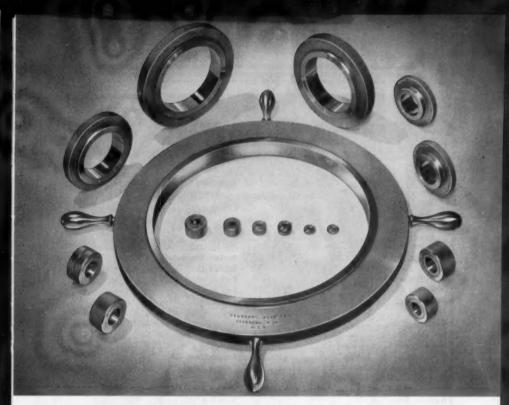
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